Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Fluid and Electrolyte Therapy in Small Animals

A PLAN for fluid and electrolyte therapy in small animals, which has widespread, practical importance in veterinary practice, is presented. Page 637

Immunization of Horses with Botulinum Toxoid

DATA indicate that horses can be effectively immunized against botulism. Page 650

Cyanacethydrazide Therapy for Swine Lungworms

THIS STUDY suggests that cyanacethydrazide is unreliable and perhaps ineffective as a metastrongylicide in swine. Page 654

Urinary Calculi in Feedlot Cattle

AMINO promazine, a new spasmolytic with direct myotropic action, has been successfully used in the treatment of urolithiasis in feedlot cattle. Page 665

Vol. 137 December 1, 1960 No. 11

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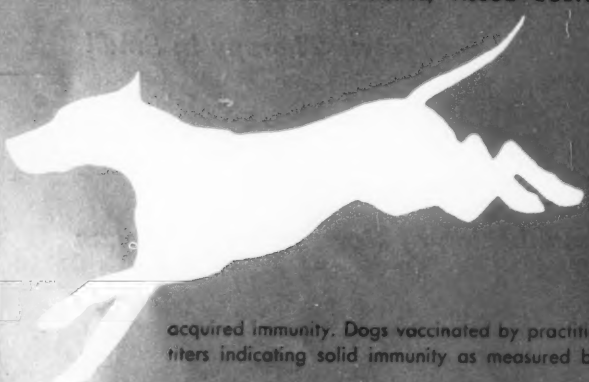

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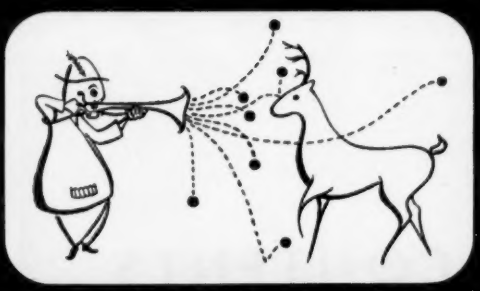
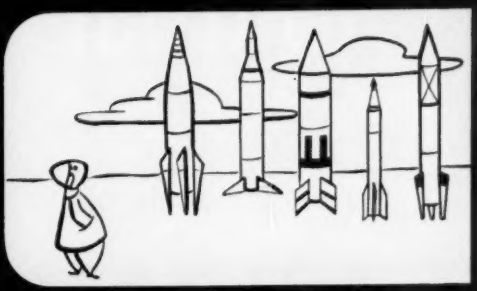
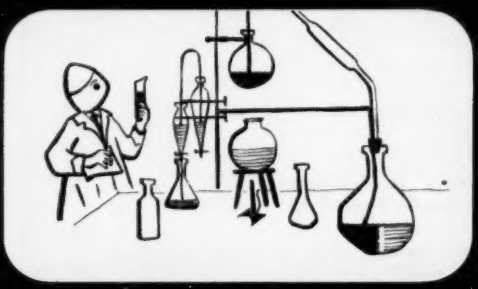


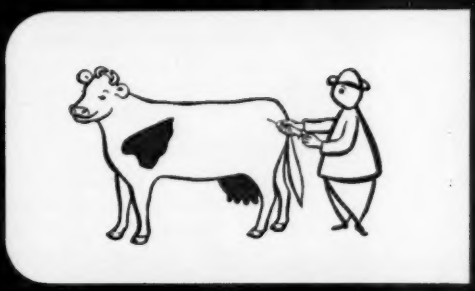
1. The Blunderbuss was fairly effective at short range



2. Today guided missiles seek out distant targets



3. Antibiotics have also come a long way since penicillin



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OF THE
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MEDICAL ASSOCIATION

Vol. 137 No. 11 Dec. 1, 1960

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Canada, $15.50; Pan American Countries, $16.50; Foreign, $17.00
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Correspondence

Purchasing Drugs and Biological Products

October 21, 1960

Dear Sir:

Your editorial, "On Purchasing Drugs and Biological Products," in the *J.A.V.M.A.* for Aug. 1, 1960, has been read with interest by members of our staff. It is gratifying to us that you have considered it important to bring this timely discussion of drugs and the pharmaceutical industry to your many readers.

s/Robert J. Benford, M.D.
Director of Medical Relations
Pharmaceutical Manufacturers Association
Washington, D.C.

Accuracy in Terminology

October 30, 1960

Dear Sir:

While there has been a good deal of discussion of accuracy in terminology in the Journal lately, I believe there is inaccurate terminology in the Oct. 15, 1960, issue. In Dr. Hamlin's fine article, "Radiographic Diagnosis of Heart Disease in Dogs," he speaks and exhibits photographs of "cross sections" he has made. These, to me, are not "cross sections" but "frontal sections." Am I correct?

s/M. Allen Cosnow
University of Illinois ('61)
Urbana, Ill.

[Editor's Note: In the original manuscript submitted by Dr. Hamlin, the term "frontal plane" was used but was later changed because of other editorial considerations. Frontal plane is an appropriate term according to its definition in Sisson and Grossman's *Anatomy of the Domestic Animals*, 4th edition, page 18.]

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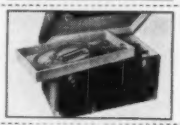

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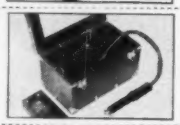

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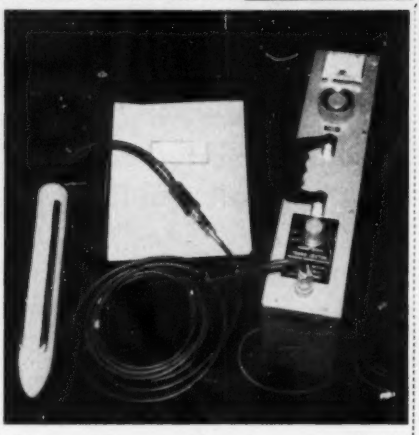

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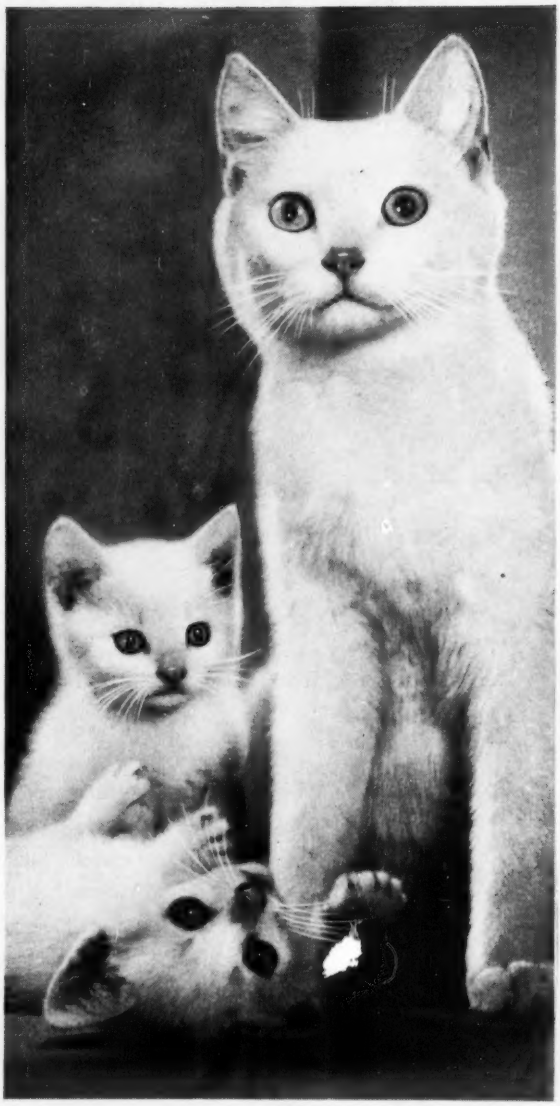

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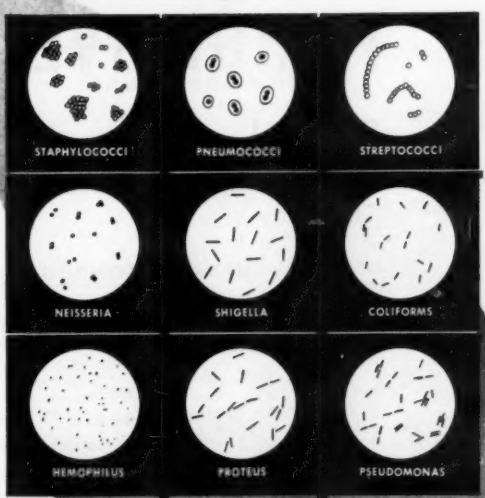

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Brand A BROAD SPECTRUM ANTIBIOTIC	■								
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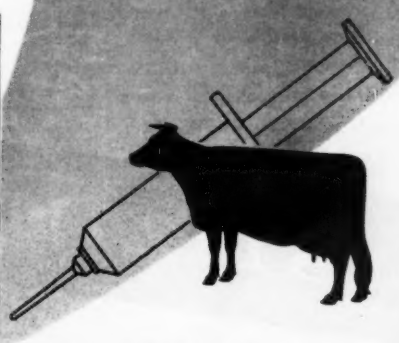

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FROM THE AVMA WASHINGTON OFFICE
J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

Study of USDA Veterinary Positions Underway

The Civil Service Commission study and survey of veterinary positions in USDA, and other agencies in the federal government, requested by AVMA got underway the latter part of October. C.S.C., in cooperation with office of personnel, USDA, and personnel division, A.R.S., will study the standards used in determining grades of veterinarians employed in the department. These standards were last reviewed and changed in 1953-54. The current study will be conducted in Washington, D.C., and at various field locations. The review team will interview veterinarians of A.R.S. and A.M.S. at all levels of operation from GS-9 upward to include those in charge of the various stations. The review is expected to be completed by March 1, 1961. It is believed this study will alleviate some of the major salary deficiencies that now exist, and should result in improvement in the area of recruiting and retaining the services of qualified veterinarians.

Radiation Exposure Laboratory Dedicated

National Naval Medical Center, Bethesda, Md., dedicated its new Radiation Exposure Evaluation Laboratory on October 14.

Colonel Yager Heads Walter Reed Veterinary Division

Colonel Robert H. Yager succeeds Colonel Starnes as Chief of the Veterinary Division, Walter Reed Army Institute of Research.

Disease-Producing Salmonella Organisms Studied

The director, A.D.E. division of A.R.S., has designated a task force of selected personnel of the division to make a review and determine the extent and nature of problems associated with disease-producing organisms of genus Salmonella (*Federal Register*, Nov. 1, 1960). The notice stated that diseases caused by Salmonella organisms can cause widespread losses in livestock and poultry, and that these and other related disease-producing organisms may be spread more often than is generally recognized. Should the study reveal that action is necessary, proposals will be formulated that will be useful to government agencies and the poultry and livestock industries in the prevention and dissemination of the contagion of such diseases.

Any person may submit written data, views, or arguments concerning this matter by filing them with the Director, Animal Disease Eradication Division, A.R.S., USDA, Washington 25, D.C., not later than December 25, 1960.

(*Continued on adv. p.* 16)

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Time Extended for Views on Interstate Poultry Movement

The time for filing written data, views, or arguments on proposed amendments (Part 84) of regulations in Title 9, Code of Federal Regulations, *has been extended to* January 1, 1961 (*Federal Register*, Oct. 29, 1960) Part 84 restricts interstate movement of poultry because of pullorum disease and fowl typhoid. Additional time was granted on request of many persons and organizations to give proposed regulations further consideration. Previous closing date was Sept. 16, 1960 (*Federal Register*, June 18, 1960). Those interested should present data, etc., by filing with Director, Animal Disease Eradication Division, A.R.S., USDA, Washington 25, D. C.

Congressmen Announce Retirement

Prior to adjournment of 86th Congress the following Republican congressmen announced their retirement: Theodore F. Green (R. I.), Thomas E. Martin (Iowa), Leo Allen (Ill.), Dave Baumhart, Jr. (Ohio), Gordon Canfield (N.J.), Henry A. Dixon (Utah), Jack Henderson (Ohio), William E. Hess (Ohio), Joseph Holt (Calif.), Donald L. Jackson (Calif.), Edward Rees (Kan.) Edna (Mrs. Sid) Simpson (Ill.), Wint Smith (Kan.), and Dean P. Taylor (N.Y.). The following Democrats also announced retirement: Graham A. Barden (N. Car.), Paul Brown (Ga.), A. S. J. Carnahan (Mo.), and Aime J. Forand (R. I.).

Liability Insurance for AVMA Members

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Feraplex, administered orally, for dogs, 1 to 3 teaspoonfuls once daily; Cats, ½ to 1 teaspoonful daily; Calves and foals, 1 to 2 tablespoonfuls daily; large animals, 2 oz. to 5 oz. daily. May be conveniently mixed with rations if desired.

*Patent Pending

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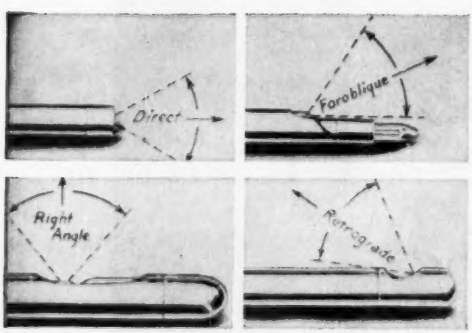

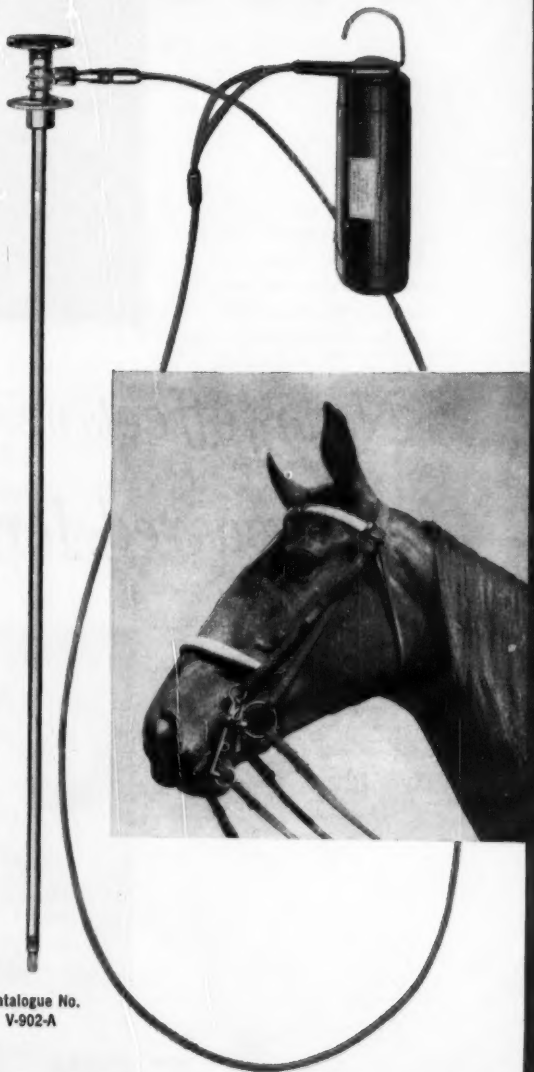

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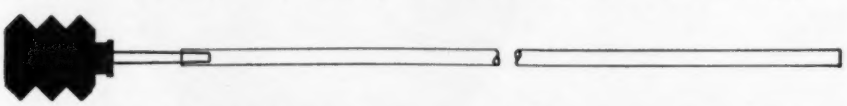

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The cow may then be bred during the next estrus.

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1. Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (April 1) 1959.
2. Vigue, R. F.: Personal communication.

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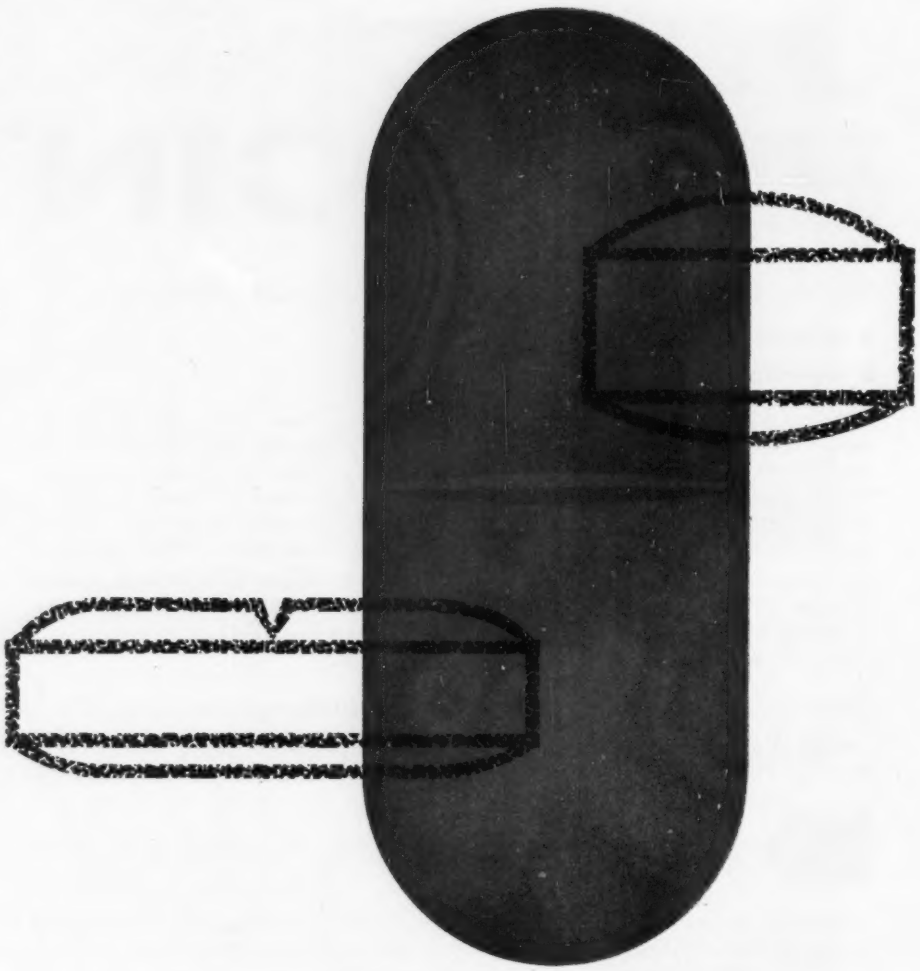

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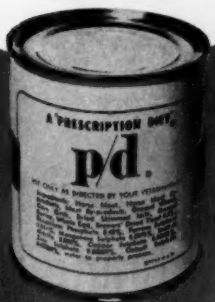

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Vol. 137
No. 11
December 1, 1960

Journal
OF THE
AMERICAN VETERINARY
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Fluid and Electrolyte Therapy in Small Animals

James B. HARRISON, D.V.M.
Howard H. SUSSMAN, M.D.
Donald E. PICKERING, M.D.

A PLAN FOR fluid and electrolyte therapy in small animals which has widespread, practical importance in veterinary practice is presented. This plan is similar to one used for man in several university teaching hospitals and by private practitioners of medicine.*

The experimental basis for the plan of therapy as used in man was based on experimental observations, many of which were made on small animals. Thus, the system has a logical application to veterinary medicine. It is used extensively in the laboratory care and research management of infant and adult macaque monkeys and other experimental animals.

From the Pediatric Endocrine-Metabolic Laboratories of the Departments of Pediatrics and Biochemistry, University of Oregon Medical School, Portland.

This work was supported in part by a grant (A-1296) from the National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Public Health Service, U.S. Department of Health, Education and Welfare.

Presented in part before the 12th Annual Conference for Veterinarians, Washington State University, Pullman, April 4, 1960.

*The general medical approach and scientific bases are described fully in a recent text, "Fluid and Electrolyte Therapy: A Unified Approach," by D. E. Pickering and D. A. Fisher.[10]

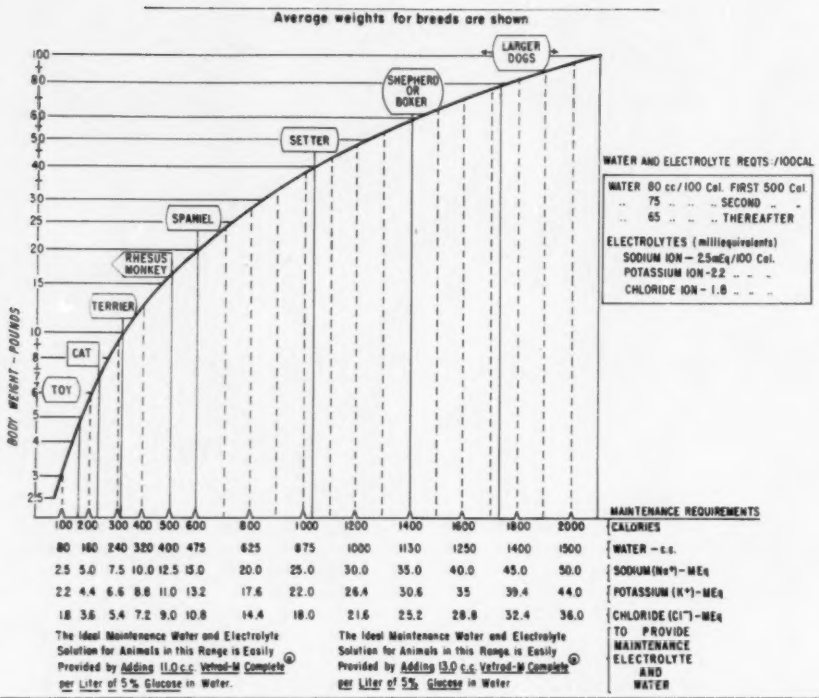
The veterinary approach has been developed by coordinating the facilities and experience of both the university group and Dr. James B. Harrison, D.V.M., Portland, Ore.

An Over-All Classification of Fluid and Electrolyte Therapy

To facilitate application of physiologic principles to individual cases, fluid and electrolyte therapy is divided into 3 phases: maintenance therapy, deficit therapy, and contemporary loss therapy.

Maintenance Therapy

Maintenance therapy consists of providing the daily essential water and electrolytes incidental to physiologic needs or losses. In health, necessary water and electrolytes are ingested in normal alimentation. Their accurate parenteral provision is essential in the animal that is incapable of oral feedings. If not supplied, the animal will become deficient in water and electrolytes. Maintenance water and electrolyte requirements parallel caloric expenditure. They are, therefore, derived from an estimation of the latter and are conveniently expressed as water in cubic centimeters (cc.) and electrolytes in milliequivalents (mEq.) per 100 calories of daily caloric expenditure. Since all animals expend calories, and since maintenance therapy is based upon caloric expenditure, the provi-


Average weights for breeds are shown
LARGER DOGS
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SETTER
SPANIEL
RHESUS MONKEY
TERRIER
CAT
TOY
BODY WEIGHT - POUNDS
WATER AND ELECTROLYTE REQTS./100CAL
WATER 80 cc/100 Cal. FIRST 500 Cal.
.. 75 .. .. .. SECOND .. ..
.. 65 .. .. .. THEREAFTER
ELECTROLYTES (milliequivalents)
SODIUM ION – 2.5mEq/100 Cal.
POTASSIUM ION-2.2 .. .. ..
CHLORIDE ION – 1.8 .. .. ..
MAINTENANCE REQUIREMENTS
CALORIES 100 200 300 400 500 600 800 1000 1200 1400 1600 1800 2000
WATER – c.c. 80 160 240 320 400 475 625 875 1000 1130 1250 1400 1500
SODIUM (Na+) – MEq 2.5 5.0 7.5 10.0 12.5 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0
POTASSIUM (K+) – MEq 2.2 4.4 6.6 8.8 11.0 13.2 17.6 22.0 26.4 30.8 35 39.4 44.0
CHLORIDE (Cl-) – MEq 1.8 3.6 5.4 7.2 9.0 10.8 14.4 18.0 21.6 25.2 28.8 32.4 36.0
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Fig. 1—Maintenance of calories, water, and electrolyte requirements for small animals restricted to a hospital.

sion of daily essential water and electrolytes can be easily ascertained, irrespective of the size or condition of the animal.[1-3,10,13]

Determination of Maintenance Requirements.—There are 2 basic steps in the determination of maintenance water and electrolyte requirements. The first is the estimation of caloric expenditure, the second is the estimation of water and electrolyte requirements relative to the caloric expenditure.

1) Estimation of Caloric Expenditure.—Basic caloric expenditure is proportional to the lean body mass.[8,11] It may be most easily estimated by reference to the animal's weight. If the animal is markedly obese, allowance should be made for the amount contributed by the excess fat since it is not metabolically active. Caloric expenditure per pound per day may be estimated (fig. 1). The values expressed make allowance for activity above basal conditions and are lax enough to include the increase in metabolic rate coincident with fever; therefore, these values serve as the base line upon which initial therapy is predicated. Repeated observations of the animal should indicate whether adjustments have to be made in each individual case.

2) Calculation of Maintenance Water, Electrolyte, and Nutritional Requirements from the Estimated Caloric Expenditure.—Maintenance water is required because of losses during the day from the lungs, kidneys, and stool. Daily water requirements to replace that lost from these sources is 80 cc./100 calories for the first 500 calories, 75 cc./100 calories for the second 500 calories, and 65 cc./100 calories thereafter.[8, 12, 12] Certain clinical situations exist in which adjustments of this relationship of water per 100 calories have to be made. These will be commented upon later.

Maintenance electrolyte requirements also occur in fixed proportions relative to caloric expenditure. The average maintenance electrolyte requirements per 100 calories are: sodium ions, 2.0 to 3.0 mEq.; potassium ions, 2.0 to 3.0 mEq.; and chloride ions, 1.5 to 2.5 mEq.

Provision of Maintenance Requirements.—To facilitate the provision of maintenance electrolytes in the proper ratio, a parenteral electrolyte concentrate for maintenance electrolytes per 100 calories is available commercially.* Each cubic cen-

*Vetrad M-Complete, Don Hall Laboratories, Portland, Ore.

TABLE 1—Maintenance Electrolyte Requirements

Substance	Requirements
Na+	2.5 mEq./100 calories
K+	2.2 mEq./100 calories
Cl−	1.8 mEq./100 calories
Lactate	2.7 mEq./100 calories

timeter provides the ideal maintenance electrolytes required per 100 calories.

Frequently, nutritional requirements have to be met in addition to the maintenance requirements for fluid and electrolytes.[1-3,10,13] Calories are most easily given as carbohydrate and fermentation ethyl alcohol. In cases in which oral intake is precluded and parenteral management is necessary for a prolonged time, or in which an extremely malnourished animal is acutely ill, the supplementation of calories and protein is important.

Parenteral Provision of Calories.—Energy requirements in acute illness and dehyration rapidly deplete the body carbohydrate reserves. They are then met by an accelerated breakdown of body fat and protein. This imposes a drain upon these sources which may result in ketosis, negative nitrogen, and intracellular ion losses. Azotemia, hyperkalemia, and hyperphosphatemia develop. These are increased in severity when impaired renal function exists. This tissue catabolism may be minimized by the administration of at least 25 per cent of the daily caloric requirement. The parenteral provision of calories must be extended over the fullest possible fraction of the day that is possible. Use of carbohydrate solutions exceeding a concentration of 10 per cent is rarely indicated. Ethyl alcohol (95%) is an excellent concentrated calorie source.[4,9,10,13] Only fermentation alcohol can be used since synthetic ethyl alcohol contains impurities which are toxic, lethal, or both.[15] It is used most advantageously in instances which require high caloric supplementation and in which water intake is restricted, such as in renal failure or shutdown. It is also valuable for its sedative effect. The following rules are usually a satisfactory guide to initiating its use.

a) It should not be used in the presence of proved or suspected hepatic dysfunction.

b) It provides approximately 7 calories/Gm.

c) Approximately 10 to 15 per cent of the calculated 24-hour caloric expenditure may be given as ethyl alcohol in the average case. Administration should not exceed 40 to 50 mg./lb./hr. This figure should be readjusted if signs of intoxication appear.

d) Parenteral vitamin C and B-complex should be provided with its use.

Parenteral Provision of Protein.—Nitrogen equilibrium should be attempted when parenteral therapy is prolonged. If 25 to 35 per cent of the estimated caloric expenditure is given to insure maximal protein-sparing action, the added administration of 10 per cent of estimated calories as immediately utilizable amino acids (protein hydrolysate) is beneficial.[10] Plasma is of little value as a source of parenteral protein because it is broken down for utilization too slowly. There are occasional idiosyncrasies to parenteral amino acids which are manifested as urticarial reactions.[6] When this happens, parenteral amino acids should be discontinued.

Average maintenance water, electrolyte, and parenteral nonprotein and protein requirements are summarized (table 2).

TABLE 2—Average Maintenance Water, Electrolyte, and Parenteral Nonprotein and Protein Requirements

Water (cc./100 cal.)	Electrolyte (mEq./100 cal.)	Calories and protein (cal./100 cal.)
Insensible water loss, stool and urine loss 80	Na+ .... 2.5 K+ ..... 2.2 Cl− 1.8	Nonprotein calories (carbohydrate and ethyl alcohol) for protein-sparing action . . 25 to 35 Protein calories . 10

The preceding principles have been incorporated in the construction of figure 1. Reference to figure 1 provides a simple method for estimating maintenance fluid and electrolyte requirements in the average animal patient. To use this graph, merely use the weight of the animal and find the point on the curve that corresponds to it. Then follow the vertical line down and read directly and in order the estimated 24-hour caloric expenditure and maintenance requirements of water, sodium, potassium, and chloride. Interpolation must be used to estimate the requirements of animals whose weights fall between the values shown.

Specific conditions exist which require modification of maintenance therapy.[10,13] These should be considered in every case prior to initiation of therapy. Important, commonly seen conditions are poor renal function, sodium retention states, excess

insensible water loss states, the chronically ill animal, the surgical patient, and conditions of compromised cardiopulmonary function. Specific considerations for each instance are stated.

1) Poor Renal Function.—Potassium restriction or omission is indicated in the presence of poor renal function or until the status of renal function is determined in shock, severe dehydration, or following surgery. A potassium-free maintenance solution, prepared for this purpose, is commercially available.*

2) Sodium Retention.—Sodium retention should be anticipated in stressful states such as those associated with major surgery, severe injury, or after the administration of mineral corticoids. Sodium and chloride requirements should be reduced up to 50 per cent during the initial 24 to 48 hours after the stressful situation. In a surgical patient or a severely injured animal, provision of adequate calories is important to minimize tissue catabolism.

3) Excess Water Loss.—Insensible water losses increase markedly in warm weather. Allowance for this should be made and additional water (10 to 15%) should be added to maintenance water requirements.

4) Chronically Ill Animal.—Special attention must be given to the provision of adequate calories and protein in the chronically ill animal for which prolonged parenteral therapy is anticipated.

5) The Surgical Patient.—A sodium retentive state exists postoperatively. The modifications stated under sodium restriction are applicable. Furthermore, establishment of proper renal function should be ascertained before instituting potassium. Water restriction should not be imposed preoperatively. We have found the *ad libitum* ingestion of water to which maintenance electrolyte solution** (1 cc. maintenance electrolyte preparation/80 cc. water) had been added during the 8-hour period prior to surgery to be satisfactory.

6) Compromised Cardiopulmonary Function.—When this occurs, as in pneumonia or congestive failure, proper fluid volume is important. Sudden overloading with fluids should be avoided.

Preparation and Administration of Maintenance Fluid and Electrolytes.—As has been previously explained, water and electrolytes are utilized in fairly fixed proportions, based upon caloric expenditure. These are most easily expressed in 100-calorie units. We have found it convenient to use electrolyte concentrates in which each cubic centimeter contains the electrolyte content required for 100-calorie expenditure. This provides an easily adaptable electrolyte source for use in animals of varying sizes and a varying range of caloric expenditure.

*Vetrad-M K-Free, Don Hall Laboratories, Portland, Ore.

**Vetrad-O-Complete, Don Hall Laboratories, Portland, Ore.

To prepare the required solution, one merely has to estimate the caloric expenditure of the animal, determine the water requirements per 100 calories, and add 1 cc. of the concentrate to each 100-calorie unit of water requirement. Thus any quantity in 100-calorie multiples is easily provided.

Examples of Maintenance Therapy.—The following situations are presented to illustrate the preparation of maintenance electrolyte solution.

Example 1.—A 20-lb. dog which does not take oral feedings must be maintained on parenteral fluids. Reading from figure 1, his daily requirements are 600 calories, 475 ml. of water, 15 mEq. of sodium, 13 mEq. of potassium, and 11 mEq. of chloride. These requirements may be given in a solution made by adding 6 cc. of a maintenance electrolyte solution* to a 500-ml. bottle of 5 per cent glucose in water. It is again emphasized that 1 cc. of the concentrate contains the desired sodium, potassium, and chloride ions corresponding to 100 calories, and that when this amount of the concentrate is added to the water requirements for 100 calories, an ideal maintenance solution is provided.

TABLE 3—Provision of Water and Electrolyte Requirements for Example 1

	Water	Na+	K+	Cl−	Caloric expenditure*
Daily requirements	475	15	13	11	600
How provided:					
5% glucose in water	475 to 500	....	.....	.....	100
Complete maintenance solution**	5	15	13.2	10.8	.....

*This estimate of caloric expenditure is used only as a guide to quantities of fluid and electrolytes needed.

**Vetrad-M Complete, Don Hall Laboratories, Portland, Ore.

Example 2.—A 60-lb. dog, hit by an automobile, has sustained multiple internal injuries and a hip fracture. Reference to figure 1 shows that daily requirements are 1,400 calories, 1,130 cc. of water, 35.0 mEq. of sodium, 30.6 mEq. of potassium, and 25.2 mEq. of chloride. These requirements would normally be met by adding 14 cc. of a complete maintenance electrolyte concentrate to 1,100 ml. of 5 per cent glucose in water; however, in this case certain specific conditions have to be considered and therapy modified accordingly.

First, this animal has undergone a stressful situation and sodium retention is anticipated. Second, his renal status is not known. Therefore, the electrolyte requirements are reduced 50 per cent during the first 24 to 48 hours and the potassium-free electrolyte maintenance concentrate* is used until renal

*Vetrad-M Complete, Don Hall Laboratories, Portland, Ore.

TABLE 4—Provision of Water and Electrolyte Requirements for Example 2

Daily requirements	Water 1,130	Na+ 35.0	K+ 30.6	Cl− 25.2	Caloric expenditure* 1,400
How provided:					
Bottle No. 1—5 % glucose in water	500	.....	....	....	100
Potassium-free maintenance solution**	3.5	8.75	....	6.3	.....
Bottle No. 2—5 % glucose in water	600	.....	....	....	120
Complete maintenance solution†	3.5	8.75	7.7	6.3	.....
Ethyl alcohol	15	.....	....	....	100

*This estimate of caloric expenditure is used only as a guide to quantities of fluid and electrolytes needed. **Vetrad-M K-Free and †Vetrad-M Complete, Don Hall Laboratories, Portland, Ore.

function is established. This is easily done by preparing the maintenance solutions in 2 bottles, using the potassium-free preparation in the first. If the animal's renal function is satisfactory after it has been given contents of the first bottle, the complete maintenance concentrate may be used in the second bottle.

Deficit Repair Therapy

Deficit repair therapy is that phase of fluid and electrolyte management which deals with the replacement of water and electrolytes lost prior to the onset of therapy. It may be most effectively instituted by following these procedures:

1) Understand the nature of deficit.
2) Estimate the degree of dehydration.
3) Quantitate specific water and electrolyte deficits by reference to tables prepared from data obtained from animals with the same diseases.
4) Administer water and electrolytes in a time sequence which considers the nature of the losses and the physiologic priorities and limits.[10]

The replacement of fluid and electrolyte deficits constitutes the most common and, therefore, probably the most important clinical situation of fluid and electrolyte management seen in veterinary practice. The most common causes of water and electrolyte deficits in small animals are the result of the enteridites with gastrointestinal losses from vomiting, diarrhea, and anorexia. Dehydration may also occur simply from a prolonged fever coupled with simple anorexia or no intake such as may occur in hardpad disease, distemper, or neglect. In dehydration due to gastrointestinal losses, fluid and electrolytes will be depleted more than in dehydration due to fever or restricted intake in which water depletion will be greater.

Treatment must be based upon an estimation of the degree of dehydration. Dehydration is best expressed in relation to body weight; therefore, the determination of weight loss is important. Dehydration will approximate 5 per cent of body weight before it is detectable. Skin and eye changes are good clues in estimating dehydration, and the following signs are helpful.[11]

Dehydration (5%).—The skin tends to remain tinted and has a "doughy" consistency. There is beginning injection of bulbar conjunctivae and dryness of the mouth.

Dehydration (7%).—Skin changes are definite, as is conjunctivae injection; dryness of the mouth is more marked. The eyeballs are sunken and soft; the urine is highly concentrated and scanty in volume.

Dehydration (10-12%).—All changes noted above are marked; shock exists in older animals, involuntary muscular twitching is often present.

Dehydration (12-15%).—Shock is usually marked. Fluid and electrolyte therapy must be promptly instituted or death will result.

Once the degree of dehydration has been approximated, the quantities of water and electrolytes needed for treatment may be derived by referring to average losses commonly encountered with the specific cause of dehydration (table 5).

TABLE 5—Average Water and Electrolyte Deficits in Dehydrated Small Animals

Disease condition	Estimated dehydration	Average deficits			
		Water (cc./lb.)	Na+ (mEq/lb.)	K+ (mEq/lb.)	Cl− (mEq/lb.)
Diarrhea or anorexia	10%	45	4	4	3
Vomiting	10%	45	4	4	5

Average deficit values are listed (table 5). Proportional deficits may be interpolated for estimated degrees of dehydration other than those listed.

Concentrated electrolyte solutions designed to approximate the deficits incurred in dehydration from vomiting, diarrhea, or anorexia have been adopted for use by us. These solutions are available commercially;* their composition is listed (table 6).

*Vetrad-D Vomiting or Vetrad-D Diarrhea, Don Hall Laboratories, Portland, Ore.

TABLE 6—Composition of Concentrated Electrolyte Solutions

Electrolyte concentrate	Composition (mEq./cc.)				
	$Na+$	$K+$	$Cl-$	Lactate	NH_4
For diarrhea	2.5	0.66	2.0	1.16	.....
For vomiting	1.66	0.66	3.0	.....	0.66

The electrolyte deficits in dehydration secondary to diarrhea or anorexia are similar. Their repair may be accomplished by administering appropriate quantities of a solution containing 3 cc. of the diarrhea concentrate to 100 cc. of 5 per cent glucose in water. The chloride deficit is relatively greater in dehydration due to vomiting; therefore, the vomiting solution contains a greater amount of chloride. Vomiting deficits may be repaired by adding 3 cc. of the vomiting concentrate to 100 cc. of 5 per cent glucose in water. The use of concentrates in repairing various degrees of dehydration due to diarrhea or vomiting are shown (table 7).

Treatment of Dehydration.—The correction of a deficit due to dehydration is best accomplished in a time sequence in which physiologic priorities and limits are considered. The following plan of therapy using the appropriate electrolyte concentrates provides the desirable rate of repletion of water and electrolyte deficits.

1) Therapy During the First 24 Hours.—In phase 1 (first 4 to 6 hours), the treatment of shock and the initial repletion of water and electrolyte deficits should be accomplished. Shock, if present, must be treated immediately. Plasma expanders such as 6 per cent dextran, a glucose polymer, or gelatin solutions are the agents of choice. A solution containing 4 to 6 cc. of the potassium-free maintenance electrolyte concentrate in 100 cc. of 5 per cent glucose in water is also satisfactory.[6] The usual amount of plasma expander to be given is 5 to 10 cc./lb. of body weight. This amount of 6 per cent dextran has been found to produce an effect on blood volume which persists for 12 to 24 hours.[5] Administration should be as rapid as possible. A venous cut-down is indicated if the intravenous infusion cannot be started by needle within 5 minutes. By the end of phase 1, 40 per cent of the estimated water, sodium, and chloride deficits should be administered.

In phase 2 (4 to 24 hours), when shock is controlled, attention is turned to the quantitative aspects of therapy. The goal during this phase is the continued repletion of water and extracellular electrolyte deficits and the addition of intracellular repair and maintenance requirements. Urine output should be adequate by 4 hours and any pathologic elevation of serum potassium should not now exist. Under these circumstances, it is safe to add potassium to the repair solution. Potassium should not be administered as a component of the repair solution at a rate greater than 0.25 mEq./lb./hr., since it cannot be utilized by the cells faster than this.[10,13] Except for potassium, a total of 80 per cent of the calculated deficits should be repaired at the end of the first 24 hours of therapy. Repair of intracellular deficits (chiefly potassium) may extend over 3 days.

When shock has been controlled, renal function established, and deficit repair under way, the daily maintenance water and electrolyte should be added to the infusion. Normal potassium requirements should be administered regardless of the amount being given in the deficit repair solution since the previously outlined limits relate to deficit therapy only. If maintenance requirements are not given, continuing deficit will ensue.

2) Therapy During the Second 24 Hours.—The remaining calculated water and electrolyte deficits are completed. Repair of intracellular deficits may take longer due to the limitations imposed by cellular uti-

TABLE 7—Use of Concentrates in Repairing Various Degrees of Dehydration Due to Diarrhea or Vomiting

Concentrated electrolyte solution	Indications	Deficit solution: cc. electrolyte solution plus cc. water	cc/lb. administered for degree of dehydration indicated		
			5% body wt.	10% body wt.	15% body wt.
For diarrhea*	Anorexia or diarrhea	3 in 100 or 30 in 1,000	25	45	65
For vomiting**	Vomiting	3 in 100 or 30 in 1,000	25	45	65

*Vetrad-D Diarrhea, **Vetrad-D Vomiting, Don Hall Laboratories, Portland, Ore.

TABLE 8—Outline of Therapy

Daily requirements and how provided	Composition of solutions			
	Water (cc.)	Na+ (mEq.)	K+ (mEq.)	Cl− (mEq.)
10 % diarrhea deficit	900	80	80	60
Repair solutions:				
Shock—5 cc. K+-free/100 cc. 5% glucose in water	150	18.8	.....	13.5
Phase 1 deficit repair—30 cc. diarrhea concentrate/1,000 cc. glucose in water	400	30.0	8.0	24.0
Phase 2—repair solution	300	22.5	6.0	18.0
Total repair at 24 hours	850	71.3	14.0	55.5
Maintenance	475	15.0	13.6	10.8

lization rates. Full maintenance fluid and electrolytes should be given. If parenteral therapy is prolonged, close attention must be given to caloric and protein supplementation. A schematic presentation of deficit repair is shown (fig. 2).

Example of Deficit Repair Therapy.—A 20-lb. dog in shock with diarrhea and 10 per cent dehydration is treated during the first 24 hours as follows.

1) Phase 1.—Shock therapy is begun. An immediate infusion of 150 cc. (7.5 cc./lb.) of a shock solution (either 6% dextran, gelatin, or glucose in water) is given. This should control shock and establish renal function.

Deficits are calculated as 900 cc. of water, 80 mEq. of sodium, and 60 mEq. of chloride (table 5). A deficit repair solution is prepared by adding 30 cc. of a diarrhea repair concentrate to 1,000 cc. of 5 per cent glucose in water; 400 cc. of the repair solution is administered during the initial 6 to 8 hours.

2) Phase 2.—In the second phase, 250 to 300 cc. of the deficit repair solution is administered over the remainder of the first 24 hours.

The maintenance requirements are calculated and are administered by the end of the first 24 hours. They are 475 cc. of water, 15.0 mEq. of sodium, 13.2 mEq. of potassium, and 10.8 mEq. of chloride. This solution is easily made by adding 6 cc. of a complete maintenance concentrate to 475 cc. of 5 per cent glucose in water.

An outline of therapy is presented (table 8).

The rate of infusion to control shock should be as rapid as possible. When shock is controlled and renal function established, the rate of infusion should be spread over 4- to 6-hour periods during each phase of therapy. Thus, in the example just presented, the administration of the first 400 cc. of deficit repair may be given in the first 3 to 4 hours at a rate of 125 cc. per hour, which is 60 drops or 2 cc. per minute. The 775 cc. of deficit and maintenance solution given in phase 2 may be given at this same rate and infused in 6 hours, or the

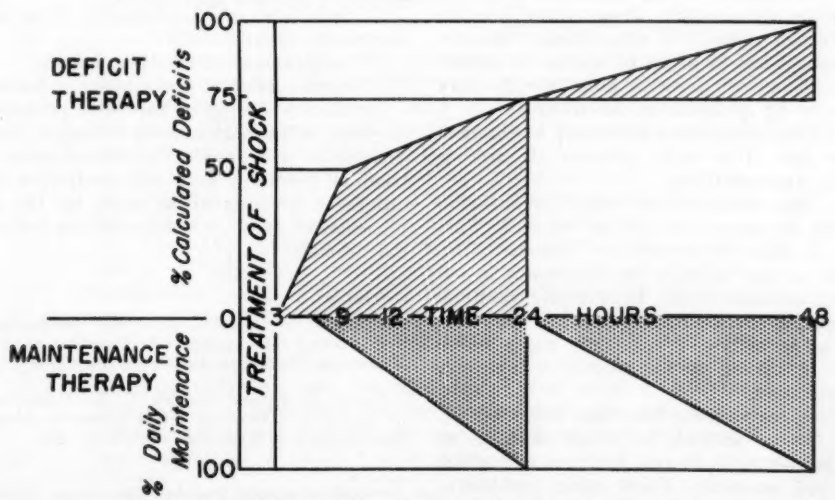

Fig. 2—General plan of fluid replacement therapy for small animals.

rate increased to 90 drops or 3 cc. per minute and infused in 4 hours.

Contemporary Loss Therapy

This therapy deals with the replacement of continuing fluid and electrolyte losses due to diarrhea, vomiting, or other conditions. These losses have to be anticipated and corrections made for them in therapy. The easiest way to provide for these continuing losses is to add an additional 5 per cent dehydration solution per 24 hours and thus provide for the anticipated deficits. Suitable adjustments may be made each day, after clinical assessment, prior to preparation of daily fluids.

Practical Considerations

There are some practical considerations of controlled fluid and electrolyte therapy which are important and simplify care. They include the following.

1) Administration of fluids is best accomplished via the intravenous route. The only other satisfactory method is by a gastric drip.

2) Record the amount and composition of all solutions administered.

3) Weigh the animal at least once daily. This is the most accurate measure of the animal's body water and gives a quantitative assessment of success of therapy.

4) Re-evaluate the patient at least once daily according to the signs listed as indicating dehydration. These signs provide the test of therapy. If they persist, therapy is inadequate. If signs of edema or pulmonary edema are present, fluid therapy may have to be quantitated downward.

5) The intravenous set should be changed daily and after each infusion of protein-containing solutions.

6) The extremity in which the infusion needle is placed should be secured. This may be done with wood or Thomas splint, or by a rope, holding the extremity in extreme extension. We have found minimal restraints necessary to contain animals during infusions. Several guy ropes which hold an animal on his side on a table are satisfactory.

7) A concentrate has been prepared for oral use in animals in which there is no contraindication to oral feedings and which are not anorexic. Each cubic centimeter contains sodium, 2.5 mEq.; chloride, 1.8 mEq.; potassium, 2.2 mEq.; phosphates, 0.3 mEq.; lactate, 2.7 mEq. Maintenance requirements may be provided by adding 2 teaspoons (10 cc.) of this concentrate to 1 quart of sweetened water. Deficit requirements (dehydration) may be provided by adding 3 to 4 teaspoons (15 to 20 cc.) to 1 quart of sweetened water. This concentrate is commercially available.*

A list of successive fluid and electrolyte disorder problems treated successfuly using the principles of therapy stated in this paper is given (table 9). These represent the frequency with which the various diseases leading to fluid and electrolyte disorders are seen in a private veterinary practice.

TABLE 9— A Summary of Fluid and Electrolyte Disorders Treated by This Approach in 1 Year of Private Practice

Disease	No.	Duration of therapy*
Gastroenteritis	437	3 — 6 days
Distemper	78	4 — 10 days
Hardpad disease	32	7 — 14 days (av.)
Injuries	45	2 — 4 days

*Longest period an animal has been maintained on parenteral fluids is 24 days.

Summary

Management of fluid and electrolyte disorders in animals may be divided into 3 phases of therapy. These are:

1) provision of maintenance fluid and electrolyte requirements;

2) replacement of existing deficits;

3) replacement of contemporary losses.

An understanding of the basic principles involved in the management of each of these categories will enable the veterinarian to treat all forms of fluid and electrolyte disorders in animals of all sizes by the application of these principles to the individual animal.

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Suspected Hypocalcemia in a Cat

A Siamese cat, which was nursing 5 kittens, was brought to our hospital for medical attention. A sixth kitten had died when 3 weeks old. The cat had rapid abdominal breathing and muscular spasms in various parts of the body, particularly in the limbs. There was stiffness of gait and movement, and occasional tetanic spasms of the entire body.

Six months earlier, this cat had given birth to 6 kittens, all of which sickened and died within 2 to 3 weeks. The first died when 3 weeks old and the last when 5 weeks old.

Since hypocalcemia similar to that associated with puerperal tetany (eclampsia) in the bitch was suspected, 5 cc. of a calcium preparation* was given subcutaneously. Within 10 minutes, some of the muscular twitching ceased, followed by distinct improvement in the cat's locomotor ability. Calcium gluconate (15 gr.) was prescribed to be given orally 3 times a day at home.

The following morning, the owner was called and stated that within a hour after the cat arrived home she was acting normally. The cat and kittens have remained well since that time.—*Sidney J. Michael, V.M.D., Erie, Pa.*

*Calphosan, Carlton Corp., New York, N.Y.

Use of Braided Nylon as a

Prosthetic Anterior Cruciate Ligament

of the Dog

Frank L. JOHNSON, D.V.M.

APPROXIMATELY 4 years ago, I began to employ a modification of the surgical procedure originally described by Paatsama[1] for repair of the anterior cruciate ligament of the stifle joint of the dog. Since then, using this modified technique, 20 prosthetic ligaments have been utilized with excellent results. In place of the tensor fascia lata utilized by Paatsama, No. 4 braided nylon suture was used. anchored by Sherman-type vitallium screws.*

This modification permitted a smaller incision and elimination of some of the disadvantages of fascia. These disadvantages are: possibility of cutting fascia too short or accidentally severing it; difficulty in passing it through the holes bored in the bone; and relatively low tensile strength. It was hoped originally that the duration of surgery and the healing time could be shortened using the modified technique, but these factors remain unchanged.

The Sherman-type screws used for this procedure are available in only one diameter (9/64 in.). Therefore, the surgery is not suited to small or toy breeds.

Surgical Technique

Strict adherence to aseptic principles is essential for good results. The stifle area is surgically prepared and draped. An incision is made starting over the lateral distal fourth of the shaft of the femur, then across the center of the joint on its dorsal surface, and ending on the medial surface of the tibia at the distal end of the tibial crest. The fascia is dissected deeply to the joint capsule, and the joint capsule is incised from slightly above the lateral condyle of the femur to the crest of the tibia, just lateral to the attachment of the distal patellar ligament. The patella is reflected medially and the joint surfaces are debrided.

An intramedullary pin with a trocar point, or bone drill approximately 3/32 or 1/8 inch in diameter, is used to drill the pilot holes in the bone. The femoral hole is drilled proximally and laterally from the point of attachment of the anterior cruciate ligament to the lateral surface of the shaft of the femur just proximal to the lateral condyle (fig. 1). The tibial hole is drilled from the point of attachment of the anterior cruciate ligament to the medial side of the tibial crest. A pilot hole for the femoral screw is then drilled through the shaft of the femur 1/4 inch above the hole on the lateral surface of the femur through which the nylon will pass. Another hole is drilled through the tibia 1/4 inch below the medial tibial hole (fig. 1).

The screws should be long enough to anchor firmly in, or pass through, the opposite cortex. The pilot holes for the screws should be small enough in diameter to permit the screws to hold securely in the bone. Prior to surgery, a little practice with a bar of soap will enable the surgeon to determine the hole size. These screws are then placed in their respective holes allowing approximately 1/8 inch of the shaft to remain protruding to serve as an anchor for the prosthetic nylon ligament.

A strand of No. 30 stainless steel wire is then used to guide a doubled strand of the braided nylon through the holes that pass

Dr. Johnson is a small animal practitioner in Cincinnati, Ohio.

*Sherman-type vitallium screws are fully threaded with a coarse thread, and have a single, deep screw-driver slot. They are available through most surgical supply houses.

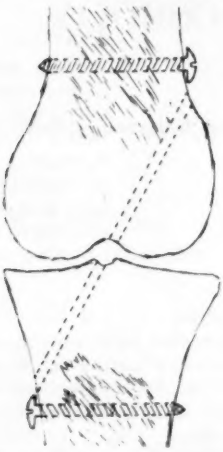

Fig. 1—Schematic drawing of the stifle joint of a dog, with locations of bone screws and outline of the drilled channels for the prosthetic nylon anterior cruciate ligament.

through the joint. The doubled end of nylon is then looped over the screw head by forming a double half hitch in the nylon. This screw is then tightened into place. The limb is held firmly in a fully extended position while the nylon is drawn tight and wrapped around the other screw and tied. One strand is wrapped around the shaft of the screw clockwise and the other counterclockwise. Each is wrapped a full turn around the shaft of the screw. After tying the nylon with a surgeon's knot, the screw is then tightened.

The surgery is completed by suturing the joint capsule and skin and by immobilizing the leg in a Thomas splint. Antibiotics are given as prophylactics. The Thomas splint may be removed after 2 to 3 weeks.

Of the legs repaired in this manner, results have been excellent with one exception. In this one instance, a local infection developed following surgery and ankylosis resulted.

On necropsy of an accidentally killed dog with a prosthetic nylon ligament about a year after surgical repair, the joint appeared normal in all respects and the nylon and screws were firmly in place.

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Bat Rabies Reported in Two More States

Rabies in bats has been reported in 2 more states. In one instance, rabies in a hoary bat in Kansas City, Mo., was diagnosed by mouse-inoculation tests at the Missouri Division of Health Laboratory. There was no known human exposure. Another rabid bat was reported by the St. Louis Division of Health Laboratory, and diagnosis was confirmed by mouse-inoculation tests. One woman was bitten on the finger by this bat.

Recovery of rabies virus from a bat in the Klamath Falls, Ore., area marks the first time a rabid bat has been reported in Oregon.—*Morbid. and Mortal. Weekly Rep., PHS, 9, (Sept. 30, 1960): 2.*

Indirect Ophthalmoscopy

in Veterinary Medicine

Lionel F. RUBIN, V.M.D.

THE INDIRECT method of ophthalmoscopy was suggested by Ruete in 1852, following the development of the direct ophthalmoscope by Babbage in 1848.

For some time thereafter, direct and indirect ophthalmoscopy were used as adjuncts to each other, since the disadvantages inherent in each method could be lessened by their conjunctional use. However, indirect ophthalmoscopy fell into disuse with the introduction of the battery-handle type direct ophthalmoscope by Crampton in 1913.

Reintroduction of indirect ophthalmoscopy to the practice of human medicine has been given added impetus in the past decade with the development of AO-Schepens Binocular Indirect Ophthalmoscope (fig. 3 and 4) and its application to pathology of the peripheral fundus and retinal detachment in man. Indirect ophthalmoscopy in its application to veterinary medicine is practically unknown in the United States.

The basic optical systems of each instrument are illustrated (fig. 1 and 2). All current direct ophthalmoscopy (fig. 1) reflects a beam of light from the light source through a mirror or prism into the patient's pupil, causing the retina of the patient to be highly illuminated. From any point on the fundus, the light rays diverge, some of them passing outward through the pupil. The examiner, placing himself in the path of these reflected rays, sees an erect image of the patient's retina as it strikes the examiner's fundus. Corrections for ametropia may be made by the interposition of a corrective lens.

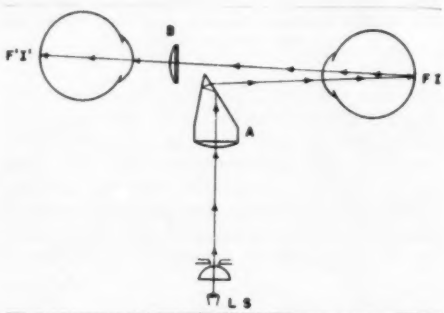

Fig. 1—Optical principle of the direct ophthalmoscope. FI = patient's fundus; F'I' = examiner's fundus; A = ophthalmoscope prism; B = corrective lens; and LS = light source.

The light source from the indirect opthalmoscope (fig. 2) is reflected from a mirror through a plus lens into the patient's fundus. The light rays reflect from the fundus back through the lens forming an inverted aerial image of the patient's fundus in space on the focal plane of the condensing lens. The observer, placing himself at comfortable distance from the aerial image, sees this image. An additional pair of lenses, one for each eye, aids in observing the image. Since the use of the condensing lens, held in the observer's hand, does not require the examiner to be extremely close to the patient's head, the indirect opthalmoscope affords greater safety to the examiner (fig. 3).

Dr. Rubin, chief, Dog and Cat Quarantine, Animal Hospital Section, Division of Research Services, National Institutes of Health, Bethesda, Md., is currently at 208 Myrtle Road, Havertown, Pa.

The author thanks the American Optical Company, Instrument Division, for the use of the AO-Schepens Binocular Indirect Ophthalmoscope; Dr. Edward Okun, NIH, for personal communications and advice; Mr. Robert L. Wolfes, Jr., animal husbandman, for his assistance in preparing the animals for examination; and Drs. Preston Holden, Joseph Atkinson, and William I. Gay for reviewing this report.

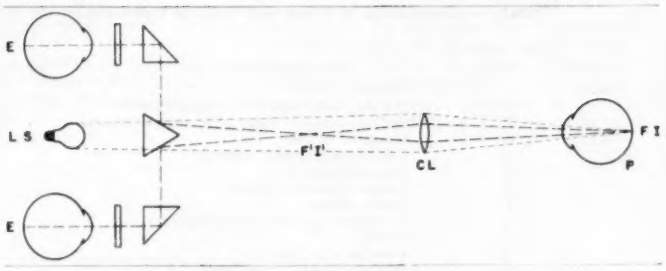

Fig. 2—Optical principle of the binocular indirect ophthalmoscope E = examiner's eyes; LS = light source; P = patient; FI = patient's fundus; CL = corrective lens; and F'I' = image of patient's fundus in space.

Comparison of the two opthalmoscopes was made by examining 541 animals of 9 species. These included 300 dogs, 100 cats, 8 squirrel monkeys, 12 cynomolgous monkeys, 12 rhesus monkeys, 10 New Zealand White rabbits, 4 horses, 3 sheep, and 2 goats. Both eyes were examined in all subjects. Direct opthalmoscopy was not attempted in primates because of potential danger to the observer.

All animals were in good general health. With the exception of the dogs and cats, all eyes had normal corneas, lenses, and clear media. Lesions were found in 64 eyes in 40 dogs and in 12 eyes in 11 cats. The abnormalities are listed (table 1). All animals were examined in a dark room under induced mydriasis except for 8 glaucomatous eyes which were fully dilated as a result of the disease.

The comparative advantages of the 2 types of ophthalmoscopes varied with the species and with the pathologic condition present. The general advantages of the binocular indirect ophthalmoscope were stereoscopy, maximum penetrability, wide fundus field, rapid examination, ability to compare the 2 eyes quickly, and ability to view the extreme fundus periphery. The general advantages of the direct opthalmoscope were greater magnification, greater detail, and ability to view the more anterior positions of the eye.

Examination of the horses was difficult under direct ophthalmoscopy because of the proximity required of the instrument and observer. Sudden movement of the head provides an additional hazard to the observer and makes a complete examination difficult. The indirect ophthalmoscope provided a much more comfortable distance from examiner to subject and negated the effects of head movement since adjustments were easily made. Disadvantages were the occasionally annoying reflex of the strong beam of light from the corpora negra, and the restriction of movement of the observer due to the variable transformer.

Ophthalmoscopy of goats and sheep had the same advantages and disadvantages as in horses.

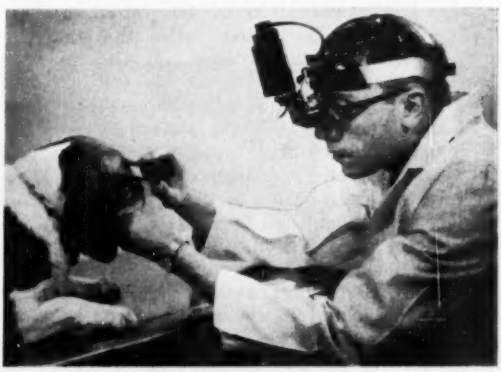

Fig. 3—The AO-Schepens indirect ophthalmoscope in use.

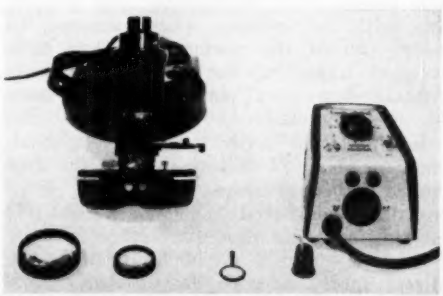

Fig. 4—The AO-Schepens Binocular Indirect Ophthalmoscope. Foreground (left to right): +14D large diameter lens, +20D medium size lens, +20D small diameter lens, scleral depressor. Background (left to right): The Binocular Indirect Ophthalmoscope, 6.5V A-C variable transformer.

TABLE 1—Comparison of Direct and Indirect Ophthalmoscopy in Diseased Eyes

Species	Eyes affected (No.)	Pathologic findings	Fundi visible with direct ophthalmoscope	Fundi visible with indirect ophthalmoscope
Canine	2	Nebula, corneal.	1	2
	2	Nebula with superficial vascularization.	0	1
	7	Shallow corneal ulcer with vascularization.	0	2
	6	Metabolic cataract.	3	6
	2	Anterior subcapsular cataract.	0	2
	4	Juvenile cataract.	0	3
	3	Posterior cortical cataract.	1	3
	2	Senile cataract.	0	2
	5	Glaucoma (primary and secondary).	2	4
	2	Uveitis.	2	2
	2	Vitreous opacities.	2	2
	17	Senile endothelial dystrophy.	8	17
	4	Posthepatitic corneal edema.	1	3
	4	Pigmentary keratitis.	0	1
	64		20	50
Feline	3	Nebula, corneal.	2	2
	2	Leukoma, corneal.	0	0
	3	Glaucoma	2	2
	4	Ulcers with vascularization	1	2
	12		5	7

The examination of the rabbit fundus proved to be easier with the indirect ophthalmoscope because of the bizarre structure of the fundus. Direct ophthalmoscopy was confusing because of indistinct delineation of the optic nerve and its surrounding field.

No direct ophthalmoscopy was attempted in the examination of the primates because it was considered too hazardous. With indirect examination, adequate images were produced when the condensing lense was held between 1½ and 2½ inches from the patient's eye. In the study of the squirrel monkey, the hand holding the condensing lens was protected with a glove, while the other hand restrained the monkey's head in all examinations.

Ophthalmoscopy in the normal cat and dog proved both comfortable and rewarding with the indirect ophthalmoscope. In nearly all of the normal dogs and cats, a good image of the nasal ora ciliaris retinae and pars plana could be seen. It was impossible to observe the ora ciliaris retinae with the direct ophthalmoscope. No sedation was used; the free hand provided adequate restraint when viewing. Additional help was needed for holding only the most excitable animals.

The powerful beam of light in the indirect ophthalmoscope was obviously preferable for examining eyes with lesions causing interference with light transmission. Of animals with definite eye disease, penetration was obtained with the indirect ophthalmoscope in 80.6 per cent of the canine eyes and 58.3 per cent of the feline eyes, as compared with 32.3 per cent and 41.7 per cent, respectively, using the direct ophthalmoscope (table 1).

In 2 animals with metabolic cataracts and 2 with glaucoma in which the fundus was seen with the indirect ophthalmoscope only, the discovery of retinal atrophy averted the need for surgical procedures.

Conclusions

In comparison with direct ophthalmoscopy, the chief advantages of the indirect method are increased penetrability of the light beam, added speed of examination, wider fundus field, ability to examine the peripheral fundus, and added safety to the observer. The binocular indirect ophthalmoscope has a lower magnifying capacity and is more costly than the direct type. A transformer is also necessary.

The direct ophthalmoscope reveals greater fundus detail and allows examination of the more anterior portions of the globe.

Neither the direct nor the indirect ophthalmoscope used alone permits a thorough examination of the animal eye. Therefore, the veterinary practitioner is urged to consider the addition of the indirect ophthalmoscope to his diagnostic armamentarium.

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Longevity of Contagious Ecthyma Virus

Contagious ecthyma (soremouth) vaccine has been produced at this station since 1932. The crude scab material used in its preparation is obtained by sheep passage. The vaccine contains fully virulent virus, is extremely stable under adverse environmental conditions, and is known to remain viable under rangeland conditions for more than a year.

On March 13, 1936, the skin in the flank region of several lambs was scarified and contagious ecthyma virus was applied. The scabs resulting from these inoculations were collected on April 1, 1936, and dried for 36 hours over concentrated sulfuric acid in a desiccator. The dried material was coarsely ground by means of mortar and pestle and then was reduced to a fine powder by grinding in a ball mill for 18 hours. Approximately 5 Gm. of the finely ground powder was placed in an amber-colored bottle which was corked and then sealed with melted paraffin. The bottle was stored in a refrigerator at 45 F.

Fig. 1—Lesions typical of contagious ecthyma resulted from inoculation of lamb with virus stored 22 years, 8 months.

On Dec. 29, 1959, the bottle containing the powdered scabs was opened and a 1:100 dilution in glycerol-saline solution (3 parts glycerol, 7 parts physiologic saline solution) was prepared. Lambs susceptible to contagious ecthyma were obtained, the skin of their lips was scarified, and the suspension applied to the scarifications. Vesicles and then pustules were produced. Fourteen days later, hard thick scabs were observed at the inoculation sites. These lesions (fig. 1) were typical of contagious ecthyma, indicating that the virus was still viable after being stored for 22 years and 8 months.—*C. W. Livingston, Jr., D.V.M., assistant veterinarian, and W. T. Hardy, D.V.M., superintendent, Substation 14, Texas Agricultural Experiment Station, Sonora.*

The Immunization of Horses with

Botulinum Toxoid

Philip G. WHITE, PH.D.
George S. APPLETON, M.S.

BOTULISM IN HORSES occurs only sporadically, but can be extremely costly to the owner and frustrating to the equine practitioner. Antitoxin has been available for many years, but unless diagnosis is prompt and serum therapy administered early in the course of the syndrome, the prognosis is usually grave. The success of several investigators[2,4-7] in the immunization of cattle, mink, pheasants, and ducks against botulism suggested that horses might respond favorably to toxoid prophylaxis. This report describes the work done to test that hypothesis.

Materials and Methods

Toxoid.—Clostridium botulinum type C toxoid, prepared by a modification of the methods of Sterne and Wentzel,[7] was used. Type C toxoid was studied because this type is suspected to be the most frequent cause of botulism in horses and because preparations of proved immunogenicity were readily available. Details of the preparation of this toxoid have been given.[3]

Immunization Schedules.—Twenty-three saddle horses were inoculated, in groups of 3 or 4, with different dosage regimens of toxoid.* Immediately before and 5 to 6 weeks after inoculation, serum samples were taken from each horse for antitoxin titration. Four groups were given single subcutaneous inoculations of 3, 5, 10, and 20 ml. of toxoid, respectively. Two other groups were given 2 inoculations of toxoid: one was given 2 doses of 3 ml. subcutaneously at a 10-day interval; the other was given 5 ml. subcutaneously, followed 13 days later by 5 ml. injected intramuscularly. A seventh group served as nonvaccinated controls.

Serology.—Since there was no international standard for type C antitoxin established at the time this work was done, an arbitrary unit value was selected. This was deemed to be the amount of antitoxin in 1/3,000 ml. of type C antitoxin.** The L_+ dose of a lot of standard lyophilized type C toxin was determined. This was the least amount of toxin which, after incubation for 1 hour at room temperature with exactly 1 unit of standard antitoxin 1/3,000 ml., was fatal to all of 5 mice within 72 hours.

To titrate the antitoxin content of the test serums, appropriate dilutions of serum were mixed with 10 L_+ doses of standard toxin and the mixtures were allowed to stand for 1 hour at room temperature. They were then placed in an ice bath pending mouse inoculations. Each of 5 mice weighing 12 to 16 Gm. was inoculated intraperitoneally with a volume of the serum-toxin mixture containing 1 L_+ dose of toxin originally; endpoints were read at 24 hours postinoculation.

The antitoxin unitage of the test serum was recorded as that quantity of serum that just neutralized 1 L_+ of standard toxin.

Results and Discussion

In a few of the horses that were given large volumes of toxoid (10 and 20 ml.), swelling ranging from 2 to 5 cm. in diameter occurred around the inoculation site. Similar swellings occurred on a few horses following the second inoculation of the smaller volumes (3 or 5 ml.) and were suggestive of an anaphylactoid reaction. No supportive therapy was administered and no sequela was encountered. All swellings subsided within a few days.

The antitoxin responses in each group of horses is given (table 1). Although the number of serum samples represented in each group was small, a trend relating increased toxoid dosage to increased antitoxin response was apparent. Two injec-

From the American Scientific Laboratories, Inc., Madison, Wis.

*The authors thank Dr. V. C. Kaschula, Rutgers University, New Brunswick, N.J.

**Fort Dodge type c antitoxin lot 47, Fort Dodge Laboratories, Inc., Fort Dodge, Iowa.

TABLE 1—Antitoxin Response of Horses to Varying Dosages of Botulinum Toxoid

No. of horses	Dose size (ml.)	No. doses*	Route administered	Antitoxin response**
5	3.0	1	Subcutaneous	3.3
4	3.0	2	Subcutaneous	31.0
4	5.0	1	Subcutaneous	5.5
3	5.0	2	1st Subcutaneous 2nd Intramuscular	26.5
3	10.0	1	Subcutaneous	13.1
3	20.0	1	Subcutaneous	39.7
3	None	..	.....	2.5

*Where 2 doses were given, an interval of 10 to 14 days separated the 2.
**Geometric mean titer per milliliter of serum, in antitoxin units as defined in text.

tions of relatively small subcutaneous doses were as satisfactory as a single large dose. Thus, 6 to 10 ml. of toxoid administered as doses of 3 to 5 ml. each at 10- to 15-day intervals were almost as effective as a single 20 ml. dose. The data suggest that the intramuscular route may be less satisfactory than the subcutaneous route (lines 2 and 4, table 1), but this may merely reflect chance variation in the responsiveness of the horses.

There is no data to suggest how the antitoxin responses were indicative of protective immunity. Judging from clinical evidence obtained in cattle,[7] it is probable that a horse carrying as little as 5 units of antitoxin would resist type C intoxication. Proof of this hypothesis would require parallel serologic and challenge studies in significant numbers of horses. The expense of such an undertaking would be prohibitive under present conditions.

Summary

Twenty-three saddle horses were inoculated with *Clostridium botulinum* type C toxoid. Two doses of 3 to 5 ml., spaced 10 to 14 days apart, elicited a better antitoxin response than did single doses of 3, 5, or 10 ml., and nearly as good a response as a single 20 ml. injection. The relationship of the antitoxin responses to protective immunity as suggested by other published data indicates that horses can be effectively immunized against botulism.

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Recovery of Horses from Sesamoid and Carpal Fractures

"Today, fewer than 10 per cent of the horses [with] sesamoid and third carpal bone fractures are destroyed. Our department of surgery (University of Pennsylvania) estimates that 60 per cent of race horses with sesamoid fractures are now returning to compete in the same quality races in which they participated before being injured. The corresponding figure for horses suffering from third carpal bone fractures is 50 per cent."—*Dr. Mark Allam. Advancing Vet. Med. (Sept., 1960): 1.*

Efficacy of Cyanacethydrazide Against

Swine Lungworms

S. A. EWING, D.V.M., M.S.
A. C. TODD, PH.D.
R. S. DORNEY, PH.D.

AN EFFICACIOUS chemotherapeutic agent for verminous bronchitis in domestic animals is needed. Inhalants traditionally employed have been largely ineffective. In general, intratracheal instillations have met with disappointing results. Some of these failures were due to toxicity of the agent employed; the helminths were killed, but the tissue damage in the host was too great to justify its usage. In other cases, *in situ* destruction of the parasites proved to be undesirable.[1,2,6] Cyanacethydrazide has been presented as an efficacious agent for verminous bronchitis; it reportedly functions by expulsion of the adult helminths from the air passages.[6-8]

Conflicting conclusions regarding the efficacy of this drug have been drawn by different investigators.[3-5] The present report constitutes another evaluation of the drug's effectiveness against lungworms in experimentally infected swine and is in general agreement with the Nebraska trials which indicated ineffective action in swine.

Materials and Methods

Each of 10 lungworm-free swine was exposed, by feeding, to approximately 400 infective larvae of *Metastrongylus apri* and *Metastrongylus pudendotectus*. The swine were in closed housing. The larvae were from laboratory-infected earthworms of the genus Eisenia. Each of the 2 parasitic species was approximately equally represented.

Daily fecal examinations were made throughout the study and were based on a 5 Gm.-sugar flotation technique to recover the ova. Observations were made throughout the study for clinical manifestations of the disease. The swine were weighed at intervals throughout the study.

The first of 3 treatments was administered to the 8 principals 55 days after exposure; the second and third injections were made 59 and 75 days after exposure, respectively. Each principal was given 1 cc. of injectable cyanacethydrazide per 35 lb. of body weight subcutaneously at each treatment. Each treatment equaled in amount the therapeutic dose of 15 mg./kg. of body weight recommended by the manufacturer. Two swine served as controls.

All swine were given a necropsy examination 4 days after the final treatment of the 8 principals. The 10 respiratory apparatus were examined for adult helminths. After recovery, the worms were enumerated and their species and sex determined. The location of the parasites and concomitant lesions were recorded.

Results

Metastrongyle ova were first recovered from the feces 33 days after exposure; at 35 days, all 10 swine were shedding ova. Details of production of ova by the helminths in both the principals and controls were determined (fig. 1). A sharp decline

TABLE 1—Worms Recovered at Slaughter

Swine No.	Metastrongylus apri		Metastrongylus pudendotectus		Total
	Male	Female	Male	Female	
1	59	60	12	9	140
2	0	0	0	1	1
3	64	122	15	12	213
4	110	134	6	7	257
5	34	27	4	3	68
6	1	0	0	0	1
7	107	188	73	41	409
8	15	6	1	3	25
9*	24	38	1	1	64
10*	38	15	2	1	56

*Control

From the Department of Veterinary Science, University of Wisconsin, Madison.

Published with the approval of the director, Wisconsin Agricultural Experiment Station, as paper No. NS 303.

Supported in part by a grant from the National Institutes of Health, and by a grant from the Fort Dodge Laboratories, Inc., Fort Dodge, Iowa.

TABLE 2—Location of Worms in Host's Lungs

Swine No.	Right lobes				Left lobes		Total
	Apical	Cardiac	Diaphragmatic	Intermediate	Apical-cardiac	Diaphragmatic	
1	....	....	62	....	....	78	140
2	....	....	1	....	....	....	1
3	....	....	109	....	....	104	213
4	....	....	125	8	10	114	257
5	....	....	29	....	....	39	68
6	....	....	....	....	....	1	1
7	....	12	171	....	....	226	409
8	....	....	19	....	....	6	25
9*	....	....	25	....	....	39	64
10*	....	....	26	....	....	30	56

*Control

in the output of ova occurred just prior to the initial treatment of the principals. No appreciable difference existed in the ova recovered from the 2 groups following treatment.

Coughing developed in all 10 swine within a week after exposure, and this was easily intensified by excitement or vigorous exercise. Coughing persisted in all or nearly all swine until prior to the second injection of cyanacethydrazide. Following the second injection there seemed to be less coughing among part of the principals while no detectable improvement occurred in the controls. Complete elimination of coughing among the principals was not accomplished even after the final treatment.

Weight gains by the cyanacethydrazide medicated swine were essentially parallel to those of the controls (fig. 2).

Details of helminth recoveries made at necropsy were tabulated (tables 1 and 2). The medicated swine harbored from 1 to 409 adult metastrongyles with an average of 139; the controls had an average of 62 mature parasites.

Areas of emphysema were obvious in the lungs of both the principals and controls, and no gross distinction could be made between the 2 groups. No helminths were found in the tracheae and few in the proximal lobes of the lungs. There was no evidence that the helminths were being expelled; the majority were crowded in the more dependent parts of the diaphragmatic lobes.

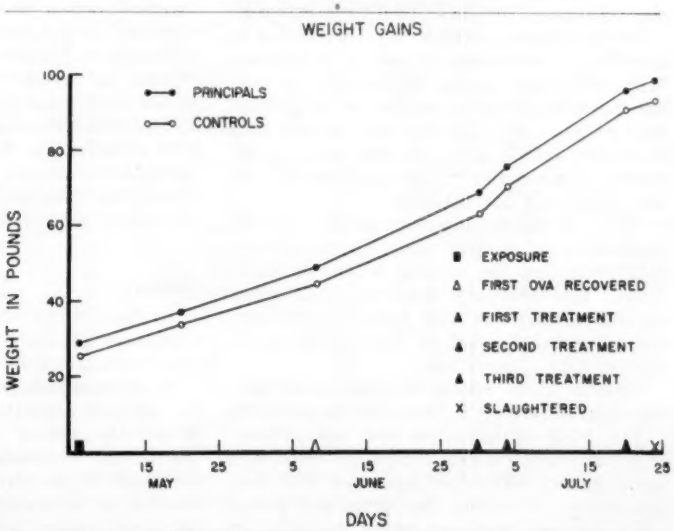

Fig. 1—Moving-average, ova production by helminths in principal and control swine and medication of principals are shown.

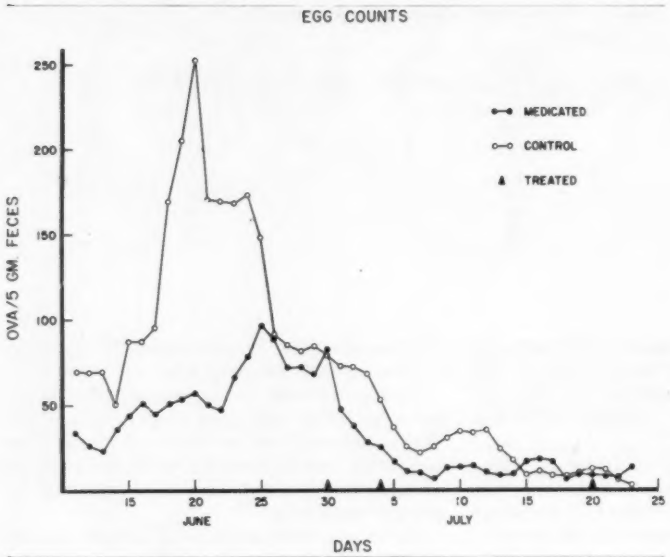

Fig. 2—Group weight gain averages of principal and control swine, as well as exposure, first recovery of ova, medication of principals, and slaughter of group are shown.

Discussion

These findings do not agree with those studies indicating effective action against swine lungworms presented by earlier workers. These present data suggest that cyanacethydrazide is unreliable and perhaps ineffective as a metastrongylicide when employed at the dosage level and on the treatment schedule used in this study.

In this present study, the drug failed to modify the production of ova by helminths. Metastrongyles appear to develop to sexual maturity, reach a maximum in production of ova, and subsequently decline to a relatively stable plane of reproductive activity. Cyanacethydrazide apparently did not affect this normal cycle.

There is no obvious explanation for the regression of clinical signs in the principals following the second of the 3 injections. The necropsy findings, *i.e.*, gross pathologic changes and helminth recoveries, were not helpful in attempting to interpret this observation.

Weight gains among the principals were essentially parallel to those of the controls.

The level of infection was not consistently affected (tables 1 and 2). Although some medicated swine harbored few helminths at necropsy, the principal group averaged over twice as many parasites as the controls. Furthermore, concentration of the helminths in the dependent parts of the diaphragmatic lobes suggests that the drug did not affect them and that expulsion was not being accomplished.

The seemingly justified, yet conflicting conclusions drawn by different investigators regarding this drug's efficacy dictate that further studies must be made in order to evaluate its position among veterinary anthelmintics. Laboratory evaluation of the efficacy of chemotherapeutic agents must be considered incomplete. The performance under circumstances of mass application in field situations is the ultimate criterion for judgment. Critically controlled experiments should continue and the findings should be correlated with those of field trials.

Summary

1) This study suggests that cyanacethydrazide is unreliable and perhaps ineffective as a metastrongylicide in swine.

2) Although there was a slight regression in clinical manifestations of parasitic bronchitis among medicated swine, this could not be explained on the basis of numbers of parasites or gross pathologic findings at necropsy. The medicated swine harbored more adult metastrongyles at

necropsy than did the controls; the gross pathologic findings were as severe among treated swine as the controls.

3) The weight gains among the principals were essentially parallel to that of the controls.

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Effect of Age Factor on Mortality in *Salmonella typhimurium* Infection in Turkey Poults

IN A PREVIOUS WORK, 84 turkey poults had been artificially exposed to an estimated 7 billion *Salmonella typhimurium* bacteria *per os* when 8 days old, with no mortality. Since the culture was known to be virulent and since losses had occurred when the immunity of day-old poults had been challenged, further investigation was indicated.

Sixteen pens, each containing 10 young poults, were allotted to 4 groups of 4 pens each (table 1). Poults in 3 pens of the first

TABLE 1—Mortality and Necropsy Results from Turkey Poults Artificially Exposed to *Salmonella typhimurium*

Group	Pen (No.)	Age (hr.)	Approx. bacterial dose per os	No. of poults per pen	No. that died within 6 days after exposure	Per cent of gross lesions (cecal plugs)
1	1	6	30 billion	10	9	90
	2	6	150 million	10	9	100
	3	6	750,000	10	9	80
	4	6	None	10	0	0
2	5	24	30 billion	10	6	90
	6	24	150 million	10	6	80
	7	24	750,000	10	2	80
	8	24	None	10	0	0
3	9	48	30 billion	10	2	60
	10	48	150 million	10	0	30
	11	48	750,000	10	0	10
	12	48	None	10	0	0
4	13	72	30 billion	10	0	70
	14	72	150 million	10	0	40
	15	72	750,000	10	0	30
	16	72	None	10	0	0

group were inoculated *per os* with living *S. typhimurium* bacilli 6 hours after hatching; poults in 3 pens of the second group were exposed when 24 hours old; poults in 3 pens of the third

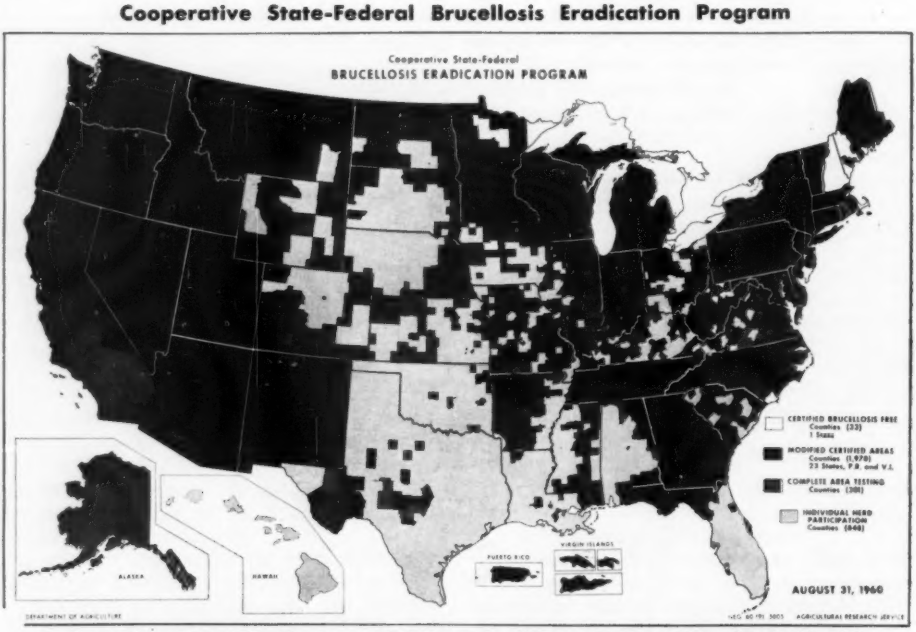
group, when 48 hours old; and poults in 3 pens of the fourth group, when 72 hours old. Poults in the fourth pen in each group served as nonexposed controls.

A 90 per cent mortality resulted in poults of the 3 exposed pens in group 1; a 20 to 60 per cent mortality in group 2; a 0 to 20 per cent mortality in group 3; and no losses in group 4. None of the control poults in any groups died. All poults were examined at necropsy 6 days after exposure.

From these results, the importance of starting young turkey poults on thoroughly cleaned and disinfected premises and of giving preventive medication in the initial feed and water is evident. Young poults are extremely susceptible to *S. typhimurium* during the first 2 days after hatching; infection during that age is usually fatal.

It is probably a basic biological truth that the newborn of any species including man, should be carefully sheltered from infection and physiologic stress during the initial hours of life until natural bodily protective mechanisms have had a chance to function. — *Bert W. Bierer, V.M.D., South Carolina Agricultural Experiment Station and Clemson College Poultry and Livestock Sanitary Departments, Columbia, S.C.*

Cooperative State-Federal Brucellosis Eradication Program



At the end of July, 1960, there were 1,970 counties (23 states, Puerto Rico, Virgin Islands) considered modified-certified areas; complete area testing in 301 counties; individual herd participation in 848 counties; and 33 counties (1 state) considered certified brucellosis-free.

Spastic Lameness of the Hindlimbs of an Aberdeen Angus Heifer

By J. D. WHEAT, D.V.M.

IN 1938, an investigator[2] described a disease affecting the hindlegs of young Holstein-Friesian cattle; it was called spastic paresis, contraction of the Achilles tendon, and "Elso Heel," because it was said that the condition could be traced to the East Friesland bull, "Elso II."

In 1956, the same condition was described in Holstein-Friesan cattle in England.[1] The ancestors of these affected cattle had been imported into England from Holland in 1936 and 1950. The condition has gradually increased in England since 1952. In 1956, a request in the *British Friesian Journal* for affected calves resulted in 25 cases of the disease being reported in 2 weeks.

The disease has also been associated with the Dutch Adema family, especially Adema 197, and association of the condition with Elso II has been denied.[3]

This condition has been seen in Holstein-Friesian cattle in the United States. During January, 1960, an Aberdeen Angus heifer 1 year old, was admitted to the University of California Veterinary Clinic for diagnosis of lameness, present since she was 6 months old. Clinical signs were the same as those seen in Holstein-Friesans with spastic lameness of the hind limbs.

With the disease, both rear legs are affected; however, the condition develops more rapidly in one leg than the other. The signs are first visible when the calf is 8 weeks to 6 months old. The hindlegs are abnormally straight and the tension on the Achilles tendon pulls the os calcis toward the tibia. From the lateral view, the hock looks small. The muscles of the rump are underdeveloped and the tail is slightly raised.

In the early stages, the hoof still touches the ground, and the pastern is straight. As the disease progresses, the entire leg appears to be shortened and the hoof, which is steep and tapered, fails to touch the ground. When the calf moves, the leg swings back and forth with most of the movement coming from the coxofemoral joint. Palpation and manipulation of the leg does not produce pain. All joints are easily flexed, there are no inflammatory or other gross changes. The quadriceps and gastrocnemius muscles undergo tonic spasms. The leg is held in a medial position, indicating that the adductor muscles are also contracted.

As the condition becomes more advanced, the calf has difficulty rising and requires time to develop equilibrium. The extensor tendon at the phalanges is prominent; the flexor tendon sheaths at the hock become distended; the calf stands with its back arched and carpal joints flexed. The condition progresses until the calf is severely crippled and is then usually euthanatized.

Fig. 1—Conformation of hindlegs of an Aberdeen Angus heifer is typical of spastic paresis. The condition is probably hereditary and may be corrected by surgery.

From the Agricultural Experiment Station, College of Veterinary Medicine, University of California, Davis.

Differential Diagnosis

This condition has been mistaken for upward luxation of the patella; however, the latter is rare in young cattle. Furthermore, in luxation it is impossible to flex the stifle before reduction of the luxation. In the spastic condition, the stifle joint can easily be flexed, although it immediately resumes its spastic state when released.

Spastic paresis has also been mistaken for gonitis, but gonitis causes gross changes in the stifle joints which the spastic condition fails to produce.

Rickets has been suggested, but further studies eliminated this possibility.[2]

Surgical Correction

In certain European countries, the disease is well known, and affected calves are operated upon as soon as observed. In the young calf, the surgical operation is highly successful. It consists of completely severing the tendon of the gastrocnemius and nicking, or partially severing, the tendon of the superficial digital flexor or superficial digital flexor muscle itself at a point midway between the tuber calcis and the musculo-tendinous junction of the gastrocnemius flexor. In older calves, 8 to 9 months old, it is often necessary to completely sever the tendon of the superficial digital flexor muscle. Severing the biceps femoris tarsal tendon in older calves has been recommended.[1] The younger the calf when the operation is performed, the more satisfactory is the cosmetic effect of the operation.

This Aberdeen Angus heifer was operated upon in the manner previously described. Because of her relatively advanced age, it was necessary to sever the tendon of the superficial digital flexor more than halfway in order to have the hocks assume the normal position. About 1 week following surgery, the remaining fibers of superficial digital flexor tendon in the left rear leg sponstaneously ruptured, causing the hock to drop to the ground. In 3 weeks, the hock again became normal in function and appearance.

Etiology

It has not been possible to demonstrate any lesions of the nervous system that might account for the signs. From breeding experiments, the condition seems due to a recessive hereditary character.[1,2]

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Counterfeit Drugs on Increase

Recently, the Food and Drug Administration warned druggists to be alert for suspicious drug-marketing practices which may indicate the marketing of counterfeit drugs. It was emphasized that the retailer should insist upon receiving his drugs only in original, sealed manufacturers' packages.

Drug counterfeiting has existed for years, but a survey now nearing completion indicates that it may be on the increase.

According to the FDA, counterfeit drugs are those which are manufactured for the purpose of being passed off as the product of another manufacturer when prescriptions are filled.

This reprehensible practice poses a serious threat to public health because it could undermine the fundamental control over the safety and efficacy of drugs.—*FDA Press Release, Oct. 13, 1960.*

Isolation of the Virus of

Infectious Bovine Rhinotracheitis

from Range Cattle

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O. C. STRAUB, DR. MED. VET.

INFECTIOUS BOVINE rhinotracheitis (IBR) is a well-known disease of feedlot cattle and, to some extent, of dairy cattle. On the basis of the occasional finding of IBR antibody in range cattle,[1,2] it is believed that the disease occurs in these cattle also. However, no epizootics or isolations of the virus from range cattle have been reported in the literature insofar as could be determined by the authors of this report. In view of this, it was considered of interest to report the isolation of the IBR virus from cattle under range conditions, thus establishing unequivocally that the disease does occur in range cattle.

The isolation was made from a 2-year-old cow in a herd of approximately 2,500 located on a large ranch in northwestern Nevada.

Husbandry Practices and History

During the summer months the cattle graze on mountain pastures 6,000 and 9,000 ft. above sea level. This particular group of cattle occupied an area in excess of 50,000 acres. Since there are a number of streams and springs in the area, the cattle become fairly well dispersed in small groups. With the onset of snow and cold weather at the higher elevations, the cattle, including calves born during the summer, gradually seek lower levels and eventually concentrate in small natural meadows at an elevation of about 4,200 ft. Here the cattle stay much closer together than at higher elevations. The last large addition to this herd was made in the fall of 1958, although several bulls were introduced the following March. The nearest feedlot is about 100 miles away.

Cattle were observed to be sick early in September, 1959, after leaving the high grazing areas; 8 died during the next several weeks. Calves that remained with their sick dams had no signs of illness. Sickness, with some death losses, occurred in 3 additional herds in the vicinity involving about 10,000 head.

The ranch manager observed discharges from the eyes of many of the cattle, some of which did not have clinical signs of illness. The muzzles of those that became ill were reddened and congested. Affected cattle had extremely stiff joints. They lost weight rapidly, and a few had diarrhea. Body temperatures were not determined. On the basis of necropsy findings, the attending veterinarian concluded that the condition was either IBR or malignant catarrhal fever. He recommended that it be investigated further and, accordingly, 1 cow which was regarded as undergoing a typical attack of the disease was brought to the School of Veterinary Medicine at Davis, Calif., on Sept. 26, 1959, for examination.

On arrival, the cow had a slight fever and some dyspnea; however, since her muzzle had been injured in transit, it was thought that the resultant swelling possibly accounted for the labored breathing. The cow had lost weight, and her mouth and nasal passages had lesions characteristic of those associated with virus diarrhea and mucosal

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The authors thank Mr. B. P. Anderson, Jr., for providing field data and clinical materials relevant to the study; Dr. R. J. Brown and Dr. M. E. Fowler of the Clinic Staff of the School of Veterinary Medicine, Davis, Calif., for their assistance.

disease. This observation was in keeping with necropsy findings in other cattle and with the fact that several of the cattle that died had had diarrhea; however, the possibility of a respiratory ailment being involved was not excluded and nasal and ocular secretions and scrapings of the buccal mucosa were cultured for virus.

Experimental Procedures

Isolation Studies.—Each milliliter of material to be cultured was treated for 3 hours at room temperature (72 F.) with 5,000 units of penicillin, 2,000 μg. of streptomycin, and 300 units of nystatin.* Five- and 50-fold dilutions of the treated materials were then made, and 1 ml. of each dilution was added to each of 5 monolayer cultures of bovine embryo kidney (BEK) cells in roller tubes. The tubes were incubated on a roller drum.

On the second day after inoculation, cytopathic changes were observed in the cell cultures inoculated with the nasal secretions. On subpassage, the same effect was observed in the cultures inoculated with the buccal mucosa scrapings although the lacrimal secretions failed to induce this change in the cells, even on serial blind passage. Because of the nature of the cytopathic pattern produced, it was felt that the isolate was probably the IBR virus. Confirmatory studies were carried out.

Identification of the Isolate by Cross Protection Tests.—The isolate, which is referred to as the "W" strain, was inoculated intranasally into a 6-month-old calf and into a known IBR-immune cow; however, results were inconclusive because only mild reaction occurred in the calf. The reaction, although mild, was fairly typical, and virus was isolated from the nasal secretions of this calf on postinoculation day 8. The body temperature of the IBR-immune cow remained within the normal range following inoculation, and the nasal secretions were negative for virus on day 8. A second cow, susceptible to IBR, was then inoculated with the agent at an early passage level and again mild, although typical, clinical signs of IBR were produced. However, the nasal washings from this cow, which were shown subsequently to contain virus by tissue culture inoculation, caused a typical and severe reaction in a susceptible calf into which they were inoculated. The immunity of both cow and calf were challenged approximately 6 weeks later with IBR virus. The cow that was given the virus culture developed an increased temperature on the ninth day following challenge exposure. Such a delayed thermal response, however, is not characteristic of IBR infection. The calf, which was given the nasal secretion from this cow, also had a febrile peak on the ninth day following immunity challenge; otherwise, the temperatures of both remained within the normal range and there was no clinical evidence of infection in either animal. One virus control animal reacted with a marked febrile and clinical response typical of IBR, whereas the IBR-immune control had no reaction to the challenge virus. Results are summarized (table 1).

TABLE 1—Results of Cross Protection Tests in Cattle

Challenged with	Recovered from infection with		Control
	Strain "W" virus	IBR virus	
IBR virus	0/2*	0/1	1/1

*No. of cattle reacting/No. of cattle inoculated.

Identification of the Isolate by Serologic Studies.—Serum from the cow from which the "W" isolate was recovered and serum of cow 502 in which this isolate had been inoculated were tested in reciprocal cross serum-virus neutralization tests, using the "W" isolate and the challenge strain of IBR virus as antigens. The procedure used was: Primary cultures of BEK were employed throughout. Serial twofold dilutions of each serum specimen were mixed with virus so that each milliliter of serum-virus mixture contained 50 $t.c.i.d._{50}$ of virus. After incubating the mixtures at room temperature for 90 minutes, 1 ml. of each dilution was transferred to each of 5 tubes of BEK from which the medium had just been withdrawn. The cultures were incubated in stationary racks and were examined daily, beginning 48 hours after inoculation, for 3 consecutive days. Any degree of cell degeneration which could be definitely recognized as a cytopathic effect was taken as the endpoint.

The results of these tests (fig. 1) established that the cow from which the "W"

*Mycostatin, E. R. Squibb & Sons, New York, N.Y.

isolate was recovered had a rising titer to both the "W" isolate and the IBR virus, and that there was complete reciprocal cross neutralization between isolate "W" and the reference strain of virus. On the basis of these findings, isolate "W" is a strain of IBR virus; however, this strain might differ in certain antigenic details from the reference strain of IBR virus with which it was compared. Further work is required in order to determine the nature and the extent of any such possible differences.

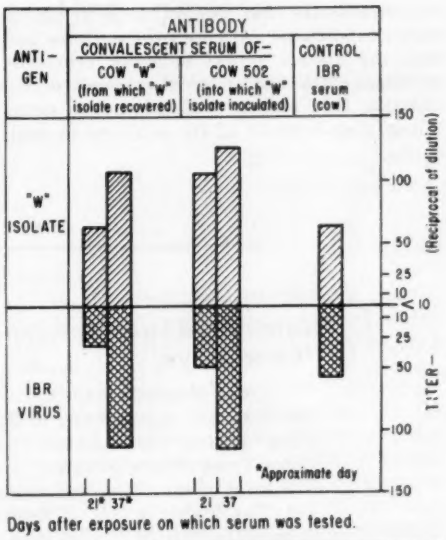

Fig. 1—Antibody response of cattle to "W" isolate as measured by reciprocal cross serum neutralization tests.

Discussion

The occurrence of IBR in range cattle, which was first suspected on the basis of the presence of antibody in the serum of range cattle, has been confirmed by isolation of the IBR virus from range cattle which had clinical signs of respiratory illness. Deaths which occurred in this epizootic are believed to have resulted from either concurrent infection, possibly mucosal disease or malignant catarrhal fever as suggested by necropsy findings, or from secondary complications. Changes attributable to these conditions undoubtedly masked the clinically less severe signs of IBR infection so that it was not possible to recognize the disease clinically as IBR in the cow that was examined at the School of Veterinary Medicine. Nevertheless, the isolation of a virus which produced the disease on inoculation into cattle leaves no doubt that, under field conditions this virus was capable of causing typical IBR.

Possibly, incidence of IBR in range cattle is low, although this assumption may be based on a situation that is more apparent than real. It is obvious that the behavior of cattle under range conditions is not as well known as that of those under close supervision. It is possible, therefore, that IBR does occur widely under range conditions but is not observed. Another possible reason why the disease is not seen in range cattle is its mildness as compared with the more severe form which occurs in feedlot cattle. It is well known that even in feedlot epizootics many cases are so mild clinically that they can be detected only by elevated temperature and by demonstration of virus. However, the condition which, in the opinion of the writers, accounts for the serious nature of the infection in cattle under feedlot conditions—namely, prolonged close contact between large numbers of cattle—is largely absent under range conditions. Close contact, a situation which is also prevalent in large dairy operations, affords a unique opportunity for the virus to pass rapidly from cow to cow. In its rapid sojourn through many members of the host species, the virus possibly acquires increased virulence. This would be expected to be manifested clinically by an infection of increased severity. Under range conditions, with the lack of circumstances conducive to rapid spread, the virus does not acquire the necessary virulence to produce a sufficiently severe infection to be detected by casual observation. Thus, the writers believe that IBR is not a disease of major importance in range cattle because of its low incidence and particularly because of its mildness. In fact, had not concurrent clinical infection or secondary complications developed, it is most unlikely that the occurrence in cattle described herein, and from which the virus was isolated, would have even been recognized.

Summary

Experiments, by viral isolation and identification, confirmed that infectious bovine

rhinotracheitis (IBR) occurs in cattle under range conditions. Although the authors feel that the disease might be more prevalent in range cattle than clinical evidence would indicate, they believe that it is not of great importance because of its mildness in such cattle.

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Nutritional Level Influences Incidence of "Cancer Eye"

From November to April for 9 consecutive years, each of 105 cows was exposed to 1 of 3 levels of winter feeding. During a 3-year period, when the cows ranged between the ages of 6 and 9 years, observations of cancer eye were made at 6-month intervals. The level of nutrition was found to affect the incidence of cancer eye. The higher levels of feeding increased the average number of cancerous sites on the eyes affected by lesions, increased the number of animals affected, and accelerated the development of the lesions. The survival rate of cows on the high level was lower than that of those on the medium and low nutritional levels.—*J. Anim. Sci., 19, (Aug., 1960): 790.*

Ependymoma Diagnosed in a Cow

Two weeks after parturition, a recently purchased Holstein-Friesian cow suddenly developed an abnormal gait with restrictive movements of both limbs of the right side. She had a tendency to lean against objects on the right side and circled in a counter-clockwise direction. Her appetite remained good, and there was no decrease in milk yield. Although the cow appeared alert, there was some impairment of vision accompanied by a sluggish pupillo-constriction reflex of the right eye. There was neutrophilia (6,420 neutrophils/cmm.). Rectal temperature was 103 F.

Because the signs indicated that there may have been an intracranial abscess, a course of penicillin therapy was given for 4 days. There was no improvement. Over the next 6 months, there was a gradual deterioration in the condition of the cow, and she eventually became recumbent on the right side. The cow was euthanatized, and a necropsy was performed immediately. A bright orange-yellow lesion on the right side of the medulla and occupying the region of the spinal vestibular nucleus was found. The area was [pyramidal] in shape, extended medially about 1 cm. from the lateral margin of the medulla, and was about 2 cm. in length.

Because of the ciliated epithelium, presence of blepharoplasts, and formation of tubules and rosettes found on histologic examination, the tumor was diagnosed as an ependymoma.—*J. Comp. Path. and Therap., 70, (July, 1960): 305.*

Urinary Calculi in Feedlot Cattle

— *Report on Treatment with Amino Promazine*

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CONSIDERATION of the possible causes, and therefore the successful treatment, of urinary calculi in feedlot cattle must involve: (1) dietary imbalance, (2) environmental factors, and (3) anatomical factors.

Rations

The tremendous increase in the number of cattle being fattened in feedlots under an intensive system of feeding is a phenomenon of recent origin. Range cattle confined to feedlots undergo a rapid change from bulky feeds of high roughage content to low bulk, high concentrate rations designed to produce maximal growth in minimal time. On range, they received adequate calcium, but feedlot rations, comprised of protein supplements, grain, and milling by-products, produce a radical change in mineral intake. The phosphorus intake is greatly increased, whereas the calcium intake is decreased. Wethers given a ration containing a calcium:phosphorus (Ca:P) ratio of 0.5:1 have had a significantly greater incidence of calculi than those given a ration with a Ca:P ratio of 1.25:1.[9]

The feeding of balanced mineral rations[5] and adequate vitamin A[4,8] are of some value in controlling urolithiasis. Water and salt intake are intimately related to the volume of urine produced and its concentration. Animals given 0.5 per cent sodium chloride in the ration had a significant incidence of urinary calculi, whereas those being force-fed a ration containing 10 per cent sodium chloride had no calculi. On a practical basis, up to 5 per cent sodium chloride may be fed to feedlot cattle as an aid in the prevention of urinary calculi.[6] With the increased consumption of water, there is a decreased concentration of crystalloids in urine.

Most authorities agree that urinary calculi consist of a mucoprotein matrix with layers of mineral elements on the surface. The concentration of the mucopolysaccharide portion of the protein is in direct ratio to the level of protein in the ration. Emphasis must be placed on the importance of hydrophilous colloids in maintaining the urinary crystalloids in solution.[7] Any decrease in these colloids from nutritional causes may increase the incidence of urinary calculi, since the stability of the crystalloid solution is impaired.

Environmental Factors

In man, the level of urinary hydrophilous colloids decreases during stress.[1] In feedlot cattle, the stress of adaptation and inclement weather may possibly have similar results. During winter months, decreased water consumption by feedlot cattle is often followed by an increase in the incidence of urinary calculi. During dehydration, the stability of the protective urinary colloids is decreased.

Anatomy

In steers, the sigmoid flexure presents a barrier through which large calculi may fail to pass. Delayed castration of calves may produce a larger lumen diameter in the male urethra, allowing some calculi to pass to the exterior.

Experience at Monfort

At the Monfort Feed Lots, Greeley, Colo., the incidence of urinary calculi is particu-

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larly great from October through March, especially when milo is fed in place of corn during the first two thirds of the fattening period. Steers brought to the hospital are variously affected. Some are uremic, with rupture of the urinary bladder having occurred. If there is extensive necrosis of the urethra, the abdominal cavity is drained by means of a trocar and cannula. A retention catheter is placed through the abdominal wall to facilitate further drainage. Urethrotomy is performed and the steer is given antibiotics, urinary antiseptics, and fluids for several days. In such steers, the mortality is extremely heavy.

When the bladder is distended and the urethra occluded, urethrotomy is performed immediately. There is usually considerable inflammatory change in the urethra and, even after surgery, urination is frequently difficult. Under epidural anesthesia, we perform a low perineal urethrotomy in fat steers weighing 800 to 1,100 lb. The site of incision is 4 to 5 inches behind the scrotum. A 4-inch incision is made and the penis exteriorized. We dissect out the urethra and suture it to the skin with 4 interrupted nylon sutures.

Alert cattlemen detect early cases of urolithiasis by watching for tail switching and other signs of abdominal discomfort. These steers may still void a little urine and repeatedly attempt to micturate. They are most amenable to treatment and are better subjects for drug therapy than for surgery.

We have used antispasmodic compounds for treatment, but results have not been entirely satisfactory. However, during the past year, we have conducted clinical trials with the smooth muscle antispasmodic, amino promazine.* This compound is the fumarate of bis(dimethylamino)-2′,3′ propyl-10 phenothiazine. In laboratory investigations, spasm of the musculature of the urinary bladder was produced by intravenous administration of pilocarpine at the rate of 1 mg./kg. of body weight. Contractions were measured by means of a metal probe introduced into the organ and connected to a Narey drum. The prior administration of amino promazine at the rate of 1 mg./kg. of body weight successfully prevented this pilocarpine-induced spasm. The effect of various antispasmodic drugs was measured on isolated rabbit intestine. Spasm of this tissue was produced by a concentration of 1 Gm. of barium chloride per liter of water. The concentration (in mg./liter) of the products under study which diminished this spasm by 50 per cent were calculated (CE50). Results:

Amino promazine ..	CE50:	1.5 mg./liter
Adiphenine	CE50:	3.0 mg./liter
Piperidolate	CE50:	7.5 mg./liter
Papaverine	CE50:	3.5 mg./liter

It was apparent that amino promazine had a strong antispasmodic activity.[2]

Our interest in the compound centered on the fact that it acts directly on the affected musculature (myotropic action), rather than indirectly (neurotropic action) as do anticholinergic drugs. Renal colic in man has responded well to treatment with amino promazine.[3] Since the action of amino promazine seems unique, our first interest was in its application to the treatment of urolithiasis in feedlot cattle. The following case histories are typical of our results.

Case Histories

Case 1.—A 900-lb. steer was brought to the hospital with signs of urolithiasis. On examination, the preputial tuft was damp, but the animal could not be made to urinate. On palpation of the penis through the sheath, a calculus was found at the sigmoid flexure. Amino promazine, 10 cc., was administered intravenously, and 30 minutes later the calculus was moved out of the urethra by manual manipulation. This animal urinated freely. On the second day, the urinations were still normal. The amino promazine injection was repeated and the steer was turned back into the feedlot. At 38 days post-treatment, he had not been returned to the hospital.

Case 2.—A 1,000-lb. steer suspected of having urinary calculi was brought to the hospital. On rectal examination, the bladder was found to be full but not in danger of rupture. The animal could not be made to urinate and the preputial tuft was dry. The calculus could not be palpated through the sheath. It was decided to delay surgery for 24 hours. Amino promazine, 12 cc., was given intravenously, and 6 hours later the preputial tuft was wet. Since the bladder was still full, another injection of amino promazine was given, and 18 hours later

*Jenotone, Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.

the animal was re-examined. The calculus could then be palpated at the sigmoid flexure. Under epidural anesthesia, the calculus was crushed with towel forceps. The steer urinated and the crushed calculus was passed. He was returned to the feedlot and has since gone to slaughter. This procedure was followed on 5 other steers with similar results in 3. Urethrotomy was performed on the remaining 2 and they subsequently went to slaughter.

Case 3.—An 800-lb. steer was brought to the hospital for treatment. A calculus could be palpated at the sigmoid flexure and the steer was able to void a little urine. Amino promazine, 10 cc., was given intravenously. About 30 minutes later, it was possible to make a rectal examination during which pressure applied to the full bladder was sufficient to move the calculus out of the urethra, allowing the steer to urinate. This steer has also gone back to the feedlot.

We have subsequently used amino promazine to treat urolithiasis in 33 other steers with satisfactory results.

Discussion

The efficacy of the compound, amino promazine, in the treatment of urolithiasis has been demonstrated.

Under field conditions, only a small percentage of the animals with urinary calculi are detected soon enough for treatment to be worthwhile. This number can be significantly increased, however, by training feedlot operators in early detection.

Amino promazine has given satisfactory results when used: (1) as the only treatment in early cases; (2) with rectal and preputial manipulation in more advanced cases; and (3) in postsurgical treatment after urethrotomy.

It should be made clear that urethrotomy does not constitute completion of treatment. Many animals may continue to experience difficulty in micturition. The postsurgical use of amino promazine will counteract urethral spasm. Co-existing cystitis may result in spasm of the internal bladder sphincter. This latter condition is uniquely susceptible to amino promazine treatment.

The use of methenamine or other urinary antiseptics is logical supportive treatment. Administration of 4 to 5 gal. of warm water by stomach tube helps to establish increased urinary flow, sometimes resulting in a "flushing" of the urinary tract.

Feedlot cattle under good veterinary supervision are the best subjects for the treatment of urinary calculi. Ranchmen who see their cattle only once or twice a week can expect little or no results in the treatment of their animals affected with urolithiasis.

Summary

Rations, environment, and anatomy influence the incidence of urinary calculi in cattle. The particular importance of a calcium supplement in high protein feeds merits emphasis. By stimulating water intake, a 5 per cent sodium chloride dietary level is of value. Decrease in protective hydrophilous urinary colloids may occur in times of stress or in dehydration.

Amino promazine, a spasmolytic with direct myotropic action, has been successfully used in the treatment of urolithiasis in feedlot cattle. Its value has been demonstrated: (1) as the only treatment in early cases; (2) with rectal and preputial manipulation in more advanced cases; and (3) in postsurgical treatment after urethrotomy.

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Leptospira pomona Isolations

by Direct Blood Culture of Clinically Infected Cattle

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THIS IS BELIEVED to be the first report of the isolation of leptospires from cattle by direct blood culture during a field epizootic in the United States. The leptospiral isolates proved to be *Leptospira pomona*.

A suspected epizootic of leptospirosis was referred* to the Leptospirosis Laboratory, School of Veterinary Medicine, University of Pennsylvania, on Oct. 19, 1959. Approximately 45 registered Ayrshire cattle were in the herd involved and 6 had clinical signs of anorexia, marked hypogalactia, and temperatures ranging from 102.0 to 105.4 F.

Samples of jugular blood were collected aseptically from affected cattle and 3 drops from each sample were immediately inoculated into 2 tubes of each of the following mediums: Fletcher's semisolid medium (Difco) with 10 per cent rabbit serum; Fletcher's semisolid medium with 15 per cent horse serum; Chang's semisolid medium[1] (Hamilton, Montana modification)[2] with 10 per cent rabbit serum; Chang's semisolid medium with 15 per cent horse serum; and Stuart's semisolid medium[3] with 10 per cent rabbit serum. Blood specimens were also collected for the microscopic agglutination-lysis test (table 1).

Five additional cows became ill the following day, October 20. Blood samples from these cattle were collected for culture and the microscopic agglutination-lysis test.

TABLE 1—Agglutination-Lysis Titers of Blood Serums from Cattle with Clinical Signs of Leptospirosis

Cow No.	Oct. 19-20, 1959	Nov. 5, 1959	Jan. 12, 1960
192	.....	1.:1600	1:100
193*	.....	1:1600	1:100
194	.....	1:400	1:100
195*	.....	1:1600	1:100
196	.....	1:100	1:100
197*	.....	1:400	1:100
198*	.....	.....	1:400
199	.....	1:1600	.....
200*	.....	1:400	.....
201	.....	.....	.....
202*	.....	1:1600	.....

*Leptospira pomona isolated.

All culture tubes were incubated at 29 C. and examined by dark-field microscopy at 7- to 10-day intervals. *Leptospira pomona* organisms were isolated from 6 cattle (table 2).

Mediums from culture tubes containing growth of leptospires were transferred into Fletcher's semisolid medium with 10 per cent rabbit serum and were subcultured at 30- to 40-day intervals. Cultures sent for typing to the WHO Reference Laboratory for Leptospirosis, Walter Reed

TABLE 2—Growth Characteristics of *L. pomona* Isolated from Cattle Blood

Cow No.	Date medium inoculated	Date growth detected	Mediums supporting growth
192	Oct. 19	None	None
193	Oct. 19	Nov. 2	All
194	Oct. 19	None	None
195	Oct. 19	Nov. 2	SS Flet.—R & H*
196	Oct. 19	None	None
197	Oct. 19	Oct. 26	SS Flet.—R
198	Oct. 20	Nov.	SS Flet.—R & H
199	Oct. 20	None	None
200	Oct. 20	Nov. 2	SS Flet.—R & H
201	Oct. 20	None	None
202	Oct. 20	Nov. 2	SS Flet.—R & H

*SS Flet. = Fletcher's semisolid medium; R = rabbit serum; H = horse serum.

From the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, to which Dr. Clark and Mr. Kresse have been assigned by Laboratory Services, Animal Disease Eradication Division, ARS, USDA, and where Drs. Marshak and Hollister are affiliated with the Section in Medicine.

*Referred by Dr. H. L. Easterbrooks, who is a general practitioner in Oxford, Pa.

Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C., were identified as *L. pomona*.

Additional blood samples were collected from the same 11 cows on Nov. 5, 1959, and Jan. 12, 1960, to determine convalescent titers. Titers determined by microscopic agglutination-lysis tests on all blood specimens are summarized (table 1).

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Time-Honored Snakebite Treatment Questioned

The accepted and recommended first-aid treatment for snakebite, consisting of tourniquet, incision, and suction, is probably more time-honored than effective. In trials, 40 mg. of rattlesnake venom was given intramuscularly to each of 30 rabbits, 20 of which were immobilized, with application of suction, for 30 minutes. The 10 control rabbits were immobilized, but no suction was applied. The average survival time of the treated rabbits was 157.5 minutes; that of the controls, 246.0 minutes. All the rabbits died, and 15 of the suction-treated group died before the controls did. These results suggest that suction may be actually conducive to a more rapid invasion of venom.—*U.S. Armed Forces Med. J., 11, (June, 1960): 682.*

Progesterone Delays First Postpartum Estrus

The effect of a single postpartum injection of progesterone (1 mg./lb. of body weight subcutaneously 14 days after calving) on the length of the intervals from parturition to involution of the uterus, first ovulation, and first heat were studied in 44 Angus and 18 Shorthorn cows. Treatment had no effect on the length of the interval between parturition and involution of the uterus. The average postpartum interval to first ovulation was significantly longer in the treated than in the untreated group (61.1 vs. 41.7 days). Average intervals from parturition to first estrus for the treated and untreated groups were 83.0 days and 65.6 days, respectively. The difference was significant.

Although progesterone treatment tended to delay ovarian activity and consequently the expression of estrus after parturition, it did not decrease the variability of any of the intervals studied. Treatment had no significant effect on conception rate.—*J. Anim. Sci., 19, (Aug., 1960): 674.*

Animal Viruses and

their relationship to

Diseases in Man

Morton KLEIN, PH.D.

THE RELATIONSHIP between animal and human pathogens has played an important role in the epidemiology of infections in man and occasionally, as in cowpox and smallpox, has resulted in a potent vaccine based upon a close antigenic but relatively distant infectious relationship.

The recent flood of new viruses has indicated that much of the area of animal-human relationships still remains unexplored. Since many of these new viruses often induce few or no characteristic clinical signs and symptoms, establishing animal-human relationships on clinical grounds will be difficult. In man, for example, only 2 clinical categories, the cold and influenza, were used until recently to identify the total of viral respiratory infections. We now know that at least two dozen viral agents are responsible for infections included in these 2 clinical categories. Viruses responsible for similar mild and nondescript symptoms undoubtedly exist in animals and are probably overlooked in clinical examinations. Thus, most of the relationships that remain to be uncovered between animal and human viral infections will not be detected by clinical examination alone, and only a systematic study using immunology and viral isolation will uncover these relationships.

Such studies will not only add to our knowledge of the natural history of viral infections but offer the hope of uncovering animal viruses that are potential vaccines by virtue of being close antigenic relatives of human viruses. It would be surprising if the relationship between cowpox and smallpox exists in nature as the only example of an animal virus that can function as an effective vaccine for man.

Several years ago, a search was initiated for viruses in cattle that might be related to infections in man, and these studies resulted in the identification of 2 bovine antigenic relatives of adenoviruses of man.[8,9] The present discussion concerns certain procedures and principles that have emerged from this study.

Several years ago, the serums of cows were commonly observed to inhibit the growth of the polioviruses. It was subsequently found[3,12] that, although the serums of cows inhibited the multiplication of each of the 3 types of poliovirus, the serums of calves at approximately 4 months of age usually did not contain the inhibitor, a pattern suggestive of a true antibody. Many other inhibitors having neutralizing activity for human viruses were observed, and identification of these heat-stable inhibitors as possible antibodies became important. If antibodies, the presence of these inhibitors indicated that there existed in nature many viruses identical to, or antigenically related to, human viruses. Studies in cows were carried out to determine the nature of the neutralizing substances to polioviruses.[3,6] Results are summarized.

Identification of Inhibitors as Antibodies

The neutralizing substances to polioviruses were widespread in cattle. We have never found a herd that does not possess them, and workers throughout the world have demonstrated the universal presence of these substances in cattle.

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Presented as part of a symposium on Virus Diseases of Dogs and Their Interrelationship to Diseases of Man, University of Pennsylvania, Philadelphia, March 3, 1960.

The author thanks Edwin Taylor, D.V.M., for his help in these studies.

The inhibitors were type-specific. Some cows had neutralizing substances to type 1 poliovirus, others to type 2 or 3, with the relative incidence of the 3 types quite similar to that found in man. All possible combinations of these 3 inhibitors were found, a pattern one would expect to find if they represented the response of the animal to 3 antigenically distinct infectious agents.

The inhibitor was in the globulin fraction obtained by precipitation with ammonium sulfate, one third saturation. There was passive transfer of the inhibitor, for calves under 3 to 4 months old had the inhibitor in high incidence. The inhibitor was found with decreasing frequency, and then appeared again more frequently starting in the approximately 6-month- to 1-year-old group. This increase in incidence with age is a typical antibody pattern. The inhibitor varied widely in titer as one would expect of a true antibody. Some cattle had no inhibitors while the serums of others at dilutions of 1:250 neutralized 100 tissue culture doses of poliovirus.

These observations permitted the conclusion that cows had antibodies to all 3 types of polioviruses. In addition to the antibodies against poliovirus, it was found that cows had neutralizing substances to human adenoviruses and again the neutralizing substances had all the properties of a true antibody.[5] In a limited study, the presence of neutralizing substances to types 4 and 5 Coxsackie B viruses was also reported.[6] In studies on the serums of other animals, no neutralizing substances to polioviruses were found in the serums of 30 dogs or several cats. Horses and swine did have neutralizing substances although in a lower incidence than cows. These latter inhibitors have not been further explored. It was concluded that cows might be a fruitful source for isolating viruses related to infections in man, and viral isolation studies were carried out in cattle. Seventy viruses were isolated, and the following observations were made concerning this study.[7,8]

Procedures for Establishing a Relationship Between an Animal Virus and a Human Virus

Freshly trypsinized calf kidney tissue culture cells for viral isolation was found superior to a maintained line of embryonic bovine kidney. Specimens were collected initially from feces, milk, blood, and nasal swabs. Feces soon emerged as the major source of viral isolations, and we stopped isolation attempts from other sources.

The 70 viruses that were isolated gave a distinct epidemiologic age pattern. Of the 70 viruses, 69 were isolated from calves in the 6-month- to 2-year-old group; all the calves were apparently clinically well. The barn is obviously a highly endemic area where rapid infection of the calves occurs with the disappearance of passive antibody.

The isolation of viruses from feces presented no serious difficulties. The basic problem was finding significant relationships between these bovine viruses and human disease. The procedure used to relate these agents to human infection was:

Commercial human *gamma* globulin is the best single substance for immunologic determination of human epidemic infections and it was used as the initial screen in detecting relationships between bovine and human viruses. Of 70 viral isolates, 2 were unequivocally neutralized by *gamma* globulin, and their identity has been determined.[8,9] They are adenoviruses, antigenically related by the specific neutralization test to types of human adenoviruses that are as yet unknown. The observations that permitted the identification of one of these viruses as an adenovirus were as follows:

The virus was isolated from the feces of an apparently healthy cow in May, 1956. One hundred tissue culture doses of the virus were neutralized by a 1:80 to 1:160 dilution of several lots of human *gamma* globulin. This human relationship was confirmed by checking with individual human serums. Thirty-eight per cent of 50 adult serums neutralized the agent, and none of 25 infant serums (6-12 months) inhibited the virus. This is a typical pattern for a human virus or a virus antigenically related to a human virus. This complete serologic screen eliminates any possibility of a nonspecific neutralizing effect and establishes an animal virus as being related to some human virus.

The first indication that an adenovirus was involved was based on the morphologic changes observed in calf kidney tissue culture. Stained infected calf kidney cultures showed a pattern of intranuclear inclusion bodies characteristic of an adenovirus.[4] That this was indeed an adenovirus was confirmed serologically. Two procedures were used. The serums of hamsters and guinea pigs immunized with the bovine

virus developed antibodies to human adenovirus as determined by the complement-fixation test. To further confirm these results, an antigen prepared from the bovine virus reacted specifically with acute and convalescent serums from a person with adenovirus infection. This, then, was an adenovirus and, although neutralized by human serums, the specific adenovirus type remains unknown. The agent is not neutralized by antiserums to types 1 to 7 adenoviruses.

Three questions remained: (1) Was this virus a human laboratory contaminant? (2) If not, was it a human adenovirus that also infects cattle? or (3) Was it a bovine virus, noninfectious for man, but antigenically related to a human virus? The data answering these questions are:

The agent was reisolated from the original fecal specimen.

The virus grows in continuous passage in calf kidney tissue culture; human adenoviruses do not. The bovine adenovirus does not grow in Hela or monkey kidney cells; human adenoviruses do. This agent then was not a laboratory contaminant; it was not a human adenovirus; it was a bovine adenovirus antigenically related to some human adenovirus. It is a bovine virus that is widely distributed, for 87 per cent of 40 serums from cows had neutralizing antibodies to the agent.

Using the fourth bovine kidney tissue culture passage, 10 ml. of a 1:10 dilution of the virus was inoculated intranasally into 2 susceptible cattle.

Although neither had any evidence of clinical illness, both were infected, as indicated by a rise in titer from less than 1:4 to 1:32 and 1:128 respectively.*

The results allow interpretation of the probable nature of the neutralizing substances to the many other human adenovirus types found in serums of cattle. These substances are antibodies that arose from multiple infection of cows with a group of bovine viruses that are not human adenovirus, but close antigenic relatives. Since neutralizing substances to other adenovirus types are present in bovine serums, particularly against the important human types 3, 4, and 7, probably these viral antigenic relatives will ultimately be found. It is not known if this bovine virus is infectious for man, since the definitive test would require human volunteers. Probably the agent would not cause any significant illness in man for it grows in calf kidney tissue culture and fails to grow in cells of human and primate origin such as Hela cells and monkey kidney cells. It should be emphasized that even if an animal virus and its human relative have apparently identical properties in the laboratory, proof of total identity requires viral challenge studies in man and animals.

*Results reported by Dr. James Gillespie, Veterinary Virus Research Institute, Cornell University, Ithaca, N. Y.

Limited Cross Infectivity of Human and Other Animal Viruses

In identifying viruses for their possible animal-human relationships, 2 important patterns of these relationships exist and should be clearly separated since their immunologic identification, epidemiologic significance, and vaccine potential are quite different. The following generalization will be made. Viruses epidemic in man are not known to exist as epizootic diseases in any animal lower than primates; however, animal antigenic relatives of these human viruses are common. A virus that is epizootic in animals may occasionally infect man, but it cannot initiate epidemics in man.

Animal Viruses Infecting Man

The known animal viruses infecting man invariably cause only localized occurrences of disease and always fail to spread through the human population. No virus is known that is capable of causing epidemics in both man and animals. Some animal viruses and rickettsiae that infect man are listed (table 1). In all cases, man is typically infected by the virus coming from the animal host and, in no case, have any of these agents been able to establish themselves in the human population. In certain instances, the explanation is simple. For example, in Rift Valley fever and lymphocytic choriomeningitis there is only a viremia, and man does not excrete the virus. In the absence of an adequate insect vector, no epidemic is possible. In other cases, for example foot-and-mouth disease, the virus is probably of such low infectivity for man that infection is essentially a rare accident. However, other animal-human relationships cannot be explained so easily. Consider Q fever and

psittacosis. These are among the most infectious agents of man; laboratory workers are at constant risk. The agents are excreted in the sputum, yet they have failed

TABLE 1—Examples of Viral and Rickettsial Infections of Animals Infectious but Not Epidemic in Man

Infection	Animal source	Excretion of virus from
Q fever*	Cattle, sheep, goats	Sputum
Psittacosis*	Birds	Sputum
Newcastle disease	Fowl, turkeys	Conjunctival exudate
Vesicular stomatitis	Pig, cow, horses	Vesicular lesions
Cowpox	Cattle	Pustular lesions
Contagious pustular dermatitis	Sheep	Pustular lesions
B virus	Monkeys	Vesicular lesions
Cat scratch fever	Cat	Pustular lesions
Foot-and-mouth disease	Cattle, pigs, sheep, goats	Vesicules
Rift Valley fever*	Sheep, cattle	No
Louping-ill*	Sheep	No
Eastern, western, St. Louis encephalitis	Birds	No
Wesselsbron	Sheep	No
Lymphocytic choriomeningitis	Mice	No

*Highly infectious in laboratory.

to establish themselves in the human population, even though localized secondary occurence of Q fever and psittacosis have been reported. These infections have never become epidemic in man. There are simultaneous occurrences of encephalitis in man and horses, but in this instance the mosquito brings the virus from a common bird source to both man and animal and rarely has subsequent man-to-man transmission by an insect vector been demonstrated. One would predict, by contrast, that urban yellow fever, dengue, and phlebotomus fever, which are transmitted by insects directly from man to man, should not be found in animals lower than primates, and they are not.

In recent studies on bovine and human reoviruses,[11] an apparent antigenic identity in some strains and the ability of the human strain to infect cattle asymptomatically has been noticed. Though the human and bovine strains are obviously closely related, proof of identity of infectivity and epidemicity, namely proof that the same virus causes an epidemic disease in man and animals, remains to be determined.

When one finds similar antibodies in animals and man, e.g., similar to polio viruses, Coxsackie, and adenoviruses, these antibodies probably arise from 2 viral agents that are antigenically similar, but each follows its own infective path. The animal virus causes epizootics in animals, and the antigenically related human agent causes epidemics in man. All of the data available is consistent with the interpretation that the widespread existence of similar antibodies in man and animal results from the presence of 2 agents that are antigenic relatives. For example, the existence in cattle of antibodies to human adenoviruses can be explained by the presence of a bovine adenovirus; antibodies to the virus of measles in dogs (or canine distemper in man), by the virus of canine distemper;[2] antibodies to human parainfluenza type 3, by a bovine parainfluenza type 3;[1], antibodies to influenza A in swine, by a swine influenza virus; antibodies to the virus of smallpox in cattle, by the virus of cowpox. It would appear then that the antibodies to the polioviruses and Coxsackie viruses in cattle do not indicate the existence in nature of a reservoir of these agents, but of antigenic relatives of these viruses. The reasons for the failure of animal viruses to become established as epidemic infections of man are obscure, but the generalization suggested is that no single virus is capable of causing separate epidemics in man and animals.

Antibodies to those animal viruses that cause only limited infections in man will not be found widely distributed in man, and human *gamma* globulin will not be useful in detecting such agents as psittacosis and vesicular stomatitis viruses. *Gamma* globulin will detect only animal viruses that are related to human viruses that cause widespread and recurrent epidemics of man, e.g., bovine adenoviruses. To identify animal viral isolates that cause localized infections in man, one must test the agent against the serums of human contacts of the animal source. The 68 bovine viruses not neutralized by human *gamma* globulin must still be tested with the serums of an adequate number of people in contact with cattle in order to con-

clude that they bear no relationship to human disease.

It is possible that animals may function as reservoirs of epidemic viral infections of man, for just as animal viruses occasionally infect man, a human virus may occasionally infect animals, although there is no precise documentation on this point. Such occasional infections, if they occur, would not be readily detected if the infection were mild, though such animals might become carriers and a reservoir for human infections. There is the analogy of the virus of psittacosis in man. The virus does not cause epidemics in man, yet at least one patient is known to have excreted the virus for 8 years, while in apparent good health. There was no known transmission to another person, although the agent was obviously still infectious for other animals since it could be isolated from the patient.[10] It is suggested then that if an animal reservoir of a epidemic virus of man does exist in nature it will not be isolated from an epizootic disease of animals. Any relationship existing between an animal epizootic virus and a human epidemic virus will be only one of similar antigenicity. It is more likely that if an animal reservoir of a human epidemic strain exists, it will be found in an occasional animal that may be functioning as a carrier of an agent. The discovery of such reservoirs is obviously difficult.

Summary

Studies have been described leading to the isolation of a bovine adenovirus closely related to a human adenovirus.

Animal viruses related to human infections fall into 2 categories: (1) antigenic relatives of human epidemic viruses that can be detected by the neutralization test with human *gamma* globulin; and (2) animal viruses that occasionally infect man and are detected by neutralization tests with serums of people in contact with the animal source of the virus.

Final identification of an animal virus relationship to a human agent requires the usual studies on growth properties, host range, hemagglutinating ability, and antigenic relationships. A generalization concerning the relationship between animal and human viruses has been proposed. Viruses of animals may *infect* man, but never initiate *epidemics* in man; *viruses epidemic in man* are not known to exist as epizootic *infections in animals* lower than primates. The search for animal reservoirs of epidemic infections of man among epizootic infections of animals will probably be fruitless. It should be emphasized that no matter how similar in terms of antigenic structure and growth properties a human and animal virus are, cross-infectivity studies are essential before one considers the possibility of identity. Major quantitative differences in infectivity are sufficient to establish an animal virus as an antigenic relative with a vaccine potential, and the evidence is accumulating that many, perhaps even most, viruses epidemic in man exist as antigenic relatives among lower animals.

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Editorial

Ear Screws for Chiquita

A good client wanted the ears of her Chihuahua to be pierced so that silver and turquoise ear screws could be worn with a matching jewel collar. She had already had the dog spayed; vaccinated against distemper, hepatitis, and rabies; and treated for minor ills on several occasions. The ear screws had been purchased. It didn't seem prudent to refuse on the grounds of frivolity and it seemed better to perform the service humanely, in a veterinary hospital, than to have the owner resort to other means.

The ear screws and an 18-gauge hypodermic needle were wet sterilized; the patient was anesthetized with thiamylal sodium; and a cork stopper was held against one side of the ear at the appropriate site as the needle was passed through the ear and into the cork. The ear screws were inserted and left in place for several weeks to insure that the holes would remain patent.

A frivolous service? Yes, but only one example of the unusual requests occasionally received by practitioners. The client had requested a service and had expected an answer. There was little time to mull it over, but there was no apparent contravention of morality or honesty.

If a client tries to obtain health certificates without prior inspection of livestock, suggests that the practitioner not bother to make a return call to determine the results of tuberculin tests, asks for "flank filling" or other acts of tampering, or asks for unlawful service of any kind, the veterinarian knows immediately what he should do. At other times, however, the course of action is governed by the circumstances and one's personal inclinations.

Practitioners who deal only seldom or never with pet owners may, not without reason, take a dim view of ear screws, jeweled collars, fur-trimmed coats, and dyed hair for pampered pets. These practitioners, if ever they are tempted to meet the pressures of the changing agricultural economy by going into small animal practice, would be well advised to consider whether they have the temperament for it. Those who would deal impatiently with the occasional whims of the pet-owning public, who would not experience the challenge and satisfaction in serving this distinctly different clientele, may find more suitable career opportunities elsewhere in the profession. On the other hand, serving the owners who consider their pets as members of the family, who place no intrinsic value on these animals, and who expect the best in modern medical care and facilities, offers a rewarding and gratifying career for a rapidly growing number of practitioners.

The practitioner decides, many times each working day, whether to render a service. We're happy to say that he's free to make the choice. According to the Principles of Veterinary Medical Ethics, a veterinarian may choose whom he will serve, but once he has undertaken the care of a patient he must not neglect it.—D.A.P.

from the *Research Journal*

Filtration of the Anaplasmosis Agent

The lysates from the blood of infected animals were passed through a filter with an average pore diameter of 0.65 μ, then added to collected whole blood from animals free of anaplasmosis. Upon subsequent examination of this blood with an electron microscope, it was seen that initial Anaplasma bodies were attached to erythrocytic membranes. When Anaplasma-free blood, admixed with filtered lysate containing initial Anaplasma bodies, was injected into animals from which the blood was originally obtained, anaplasmosis infection occurred.—[*M. Ristic: Studies of Anaplasmosis. I. Filtration of the Causative Agent. Am. J. Vet. Res., 21, (Sept., 1960): 890-894.*]

Bithionol for Tapeworms

In limited trials, bithionol [2,2'-thiobis (4,6-dichlorophenol)] was found to have teniacidal action in cats, dogs, sheep, and chickens. The optimum dosage was not established, although a dose rate of 100 mg./lb. of body weight was reasonably well tolerated and completely effective against Taenia spp. in dogs and cats and against *Moniezia expansa* in sheep. A dosage of 500 mg./kg. of body weight removed all *Railletina cesticillus* from 2 chickens.—[*F. D. Enzie and M. L. Colglazier: Preliminary Trials with Bithionol Against Tapeworm Infections in Cats, Dogs, Sheep, and Chickens. Am. J. Vet. Res., 21, (July, 1960): 628-630.*]

New Books

An Introduction to Veterinary Pharmacology

This book will have appeal as a concise source of information about drugs. The more demanding reader, however, will encounter some deficiencies which limit considerably the usefulness of this book as a reference text. There is a notable absence of information regarding (1) the physical chemistry of drug absorption, distribution, and elimination and (2) the biotransformation of drugs. The author has often alluded to the effects of drugs on physiologic processes, but he has failed to present the definitive information which would make the relationship between disease and therapy more understandable.

No bibliography has been presented. This is to be regretted; the author would undoubtedly have called to our attention many excellent papers in the British physiologic and pharmacologic literature which often are not given adequate attention in the United States. There is always a need for a test in comparative pharmacology and it is to be hoped that the author will use this book as the basis for future revision. The succinct clarity of the text is a most commendable attribute in the scientific literature.—[*An Introduction to Veterinary Pharmacology. By Frank Alexander. 179 pages; illustrated. Williams & Wilkins Co., Baltimore, Md. 1960. Price $4.75.*]—J. H. GANS.

News

Allied Organizations Contribute to AVMA Research Fund

Three allied organizations have contributed a total of $1,400 to the AVMA Research Trust Fund. The contributions, approved at the organizations' meetings held in conjunction with the AVMA annual meeting last August, came from the Conference of Research Workers in Animal Diseases, the National Association of Federal Veterinarians, and the American Veterinary Exhibitors Association.

The Conference of Research Workers in Animal Diseases said in a letter of transmittal sent along with their contribution, "The Conference of Research Workers in Animal Diseases expresses confidence in the purposes of the Research Fund of the American Veterinary Medical Association. This contribution is made in recognition of the success achieved in providing opportunity for graduate work to students in veterinary medicine."

First Trans-Atlantic Small Animal Conference to Be Held in April

For the first time in veterinary history, veterinarians in the United States and Britain will hold a postgraduate, transatlantic telephone conference. The hour-long conference, scheduled for April 20, 1961, will join the annual meetings of the American Animal Hospital Association in St. Louis, Mo., and the British Small Animal Veterinary Association in London, England, for an exchange of latest information on matters of mutual and timely concern to both organizations.

It is anticipated that the conference will be an international event, since veterinarians from several European countries will be in attendance at the England meeting. Audiences at both meetings will be able to hear the discussions, led by Dr. Wayne H. Riser in America, and Dr. Brian Singleton in England, by means of special amplification systems. Panelists from the United States and Britain are now being selected to participate in the international discussion.

Details for the conference are being planned by Dr. Brian Singleton, president of the British Small Animal Association and secretary of the International Association of Small Animal Specialists, Dr. Wayne H. Riser, president of the American Animal Hospital Association, and Dr. S. F. Scheidy, a representative of Smith, Kline and French Laboratories.

The three men making plans for the first veterinary transoceanic conference are (left to right) Dr. S. F. Scheidy, Dr Brian Singleton, and Dr. Wayne H. Riser.

Smith, Kline and French has been presenting such transoceanic conferences for various medical groups for the past three years. The veterinary conference will take place at 1 p.m. St. Louis time, and 8 p.m. London time.

Dr. Joseph Dufresne Appointed Dean, School of Veterinary Medicine, Province of Quebec

Dr. Joseph Dufresne (COR '36) has been appointed dean of the School of Veterinary Medicine of the Province of Quebec, St. Hyacinthe, by an Order-in-Council of the Legislature of the province.

Dr. Dufresne received a B.A. degree from the University of Manitoba in 1929 and a B.A.S. degree from the Institut Agricole d'Oka, at La Trappe, Quebec, in 1932. Having been granted a bursary by the provincial department of agriculture, he registered at

Dr. Joseph Dufresne

Cornell University, Ithaca, N.Y.

While in the United States, Dr. Dufresne attended several universities following courses on invertebrate zoology and anatomy. After receiving his veterinary degree, he was appointed professor of anatomy at the veterinary school at Oka. In 1947 he was appointed dean of studies, a position he held until 1958. Dr. Dufresne was one of the first French Canadians to register at McGill University to study veterinary public hygiene. He obtained a D.V.P.H. degree. in 1959, he received his license in pedagogy from the University of Montreal.

Dr. Dufresne was the first secretary of the Societe de medicine vétérinaire de la province de Quebec, and is a past-president of the Canadian Veterinary Medical Association. He is also a member of the Board of Governors of the College of Veterinary Surgeons of the province of Quebec.

Dr. Gustav Danelius Visits AVMA

A recent visitor to the AVMA central offices in Chicago was Dr. Gustav Danelius of Uppsula, Sweden.

Dr. Danelius has visited the United States several times since 1926 when he was a Rockerfeller Foundation scholar doing postgraduate work at the University of Pennsylvania. On his most recent trip, he visited the schools of veterinary medicine at the University of Pennsylvania, Cornell University, the University of Illinois, Purdue University, and the University of Wisconsin. He said he made the trip because he likes to keep abreast of developments at schools of veterinary science and medicine.

Dr. Gustav Danelius (right) is shown talking with Dr. John G. Hardenbergh, former AVMA executive secretary (left), and Dr. Harry E. Kingman, AVMA executive secretary, at the Association's central offices.

Since Dr. Danelius retired as state veterinarian for the province of Uppsula, Sweden, he has been maintaining a general practice. In 1957 and 1958, he had worked for the United Nations' Food and Agricultural Organization in Egypt. He had also served on the faculty of the school of veterinary medicine at the University of Stokholm for several years.

AVMA Research Fund Equipped to Handle Many Kinds of Contributions

Recently, an AVMA member made a rather unique donation to the AVMA Research Fund. His contribution consisted of ten shares of a stock having a market value of approximately $100 per share. This form of giving is not unusual to many charities and alumni funds, but it is the first gift of this type to the AVMA Research Fund. The fund itself is equipped to receive several types of donations.

The usual donation to the Research Fund is a cash contribution. It is exempt from personal income tax, within limitations. The contributor who donates cash needs only to document his tax-exemption claim with the receipt furnished by the Trust.

In some situations, however, an advantage is gained through the donation of stocks or bonds. Though a donor may have paid a relatively low price for the certificates, he may claim a tax exemption for their market value at the time of the donation, and he is exempt from paying capital gains tax. Since the limitations of such exemption vary, it is best to consult with legal counsel when considering a gift of this kind.

Some givers may wish to make gifts to the Research Trust through their wills. Such gifts will result in inheritance tax savings. Again, the amount of the saving must be computed on an individual basis and counsel is advisable.

It is also possible for a donor to make gifts of real property during his lifetime, but to retain the income of the property for life with the stipulation that the principal should go to the Research Trust when he dies. The advantage of this method is that the individual retains the use of the property for life, obtains an immediate income tax deduction, and eliminates inheritance tax on the property.

Under the present tax laws, donors also may make outright gifts of property to the Research Trust. This is an attractive plan for a person in a high tax bracket whose property has low cost basis in relation to present market value. If he sold his property, he would be subject to a capital gains tax. If, on the other hand, he gave the property to the Research Trust, he would pay no capital gains tax and would be entitled to a charitable deduction based upon the market value of the property.

These are just a few of the forms of giving in common practice today. The machinery for such giving to the Research Fund exists. In each situation, however, limitations of exemption vary. Upon request, the AVMA's legal counsel will advise individuals interested in making donations to the Research Fund.

Gnotobiotics — New Discipline in Biological and Medical Research

Gnotobiotics is defined as a study of a species in the absence of all other species or in the presence of only known species. It permits animal experimentation with relatively few variables. The absence of all species other than the ones under investigation cannot be demonstrated unequivocally, but the absence of certain groups of organisms can be attested by specific examinations. The term, *gnotobiota,* is appropriate to designate biota of known composition assembled from pure isolates. An individual organism is termed a *gnotobiote.* Germ-free experimental animals are often considered gnotobiotes.

There are at least 3 grades of gnotobiotes. *Alpha* gnotobiotes are those reared through generations in a sterile environment, the sterility of which is assured not only by periodic sterility tests but also by a series of physical control procedures to deduct failure of either the apparatus or its operation.

Beta gnotobiotes are maintained in an *alpha* type environment, but, because they do not reproduce, it is necessary to determine the gnotobiotic status by examining a statistically insignificant number of animals before using them.

Gamma gnotobiotes are maintained under circumstances in which accidental contamination may occur. The *gamma* type of operation is the one used thus far. One may secure an accumulation of inapparent contaminations under *gamma* operating conditions, but the contamination rate of the present equipment indicates that this hazard is not great when the experiments run less than 6 months.

Some of the most important reported research work using gnotobiotes, has been on transmethylation, experimental dental caries, amoeba-bacterial relationships, vitamin metabolism, nutrition, and antibiotic growth stimulation.—*Perspectives in Biology and Medcine, 1, (Summer, 1958): 447-456.*

Dr. I. F. Huddleson Receives Kimble Methodology Award

Dr. I. Forest Huddleson (MSU '25) was given the 1960 Kimble Methodology Award for devising a simple and quick method for determining the presence of disease-causing bacteria in the blood of infected man and animals.

Dr. Huddleson, a professor of microbiology and public health at Michigan State University, was named the ninth winner of the award by the Conference of State and Pro-

vincial Public Health Laboratory Directors. The award, $1,000 and a sterling silver plaque, was presented to him at the Conference's annual meeting in San Francisco, October 31.

Dr. Huddleson had developed the first satisfactory method for distinguishing the genus of Brucella bacteria in 1928. Through persistent study, he recently devised a simpler and more useful method for discovering the presence of Brucella and other pathogenic bacteria in blood. The method, in essence, is to use the blood itself with a granular resin similar to that used in water softeners as the culture medium. This method eliminates the past practice of adding blood to liquid culture medium.

The Kimble Methodology Award is sponsored by the Kimble Glass Co., a subsidiary of Owens-Illinois. It gives public recognition and financial reward to an individual, or individuals, who contribute outstandingly to developing new or better methods of procedure in the field of public health. Members of the Public Health Laboratory Directors Conference make the selection each year.

Dr. I. Forest Huddleson

Other awards received by Dr. Huddleson are: AVMA International Veterinary Congress Prize (1940); Borden Award (1944); honorary professor, National Veterinary College, University of Mexico (1940); Sigma Xi Award, Michigan State University Chapter (1944); Alumni Award, Michigan State University (1948); and Pasteur Award, Illinois Society of Bacteriologists (1948).

Dr. Huddleson is a member of the AVMA and the Society of American Bacteriologists, a fellow of the American Academy of Microbiologists and the American Association for the Advancement of Science, and a corresponding member of the Royal Academy of Medicine, Belgium.

He has had two books on brucellosis published and has written 170 scientific reports and bulletins.

Veterinarians Discuss Zoonoses, Farm Hazards at AMA's Regional Rural Health Conference

The relation of animal diseases to human health is "much more comprehensive" than previously thought, and 49 of 100 diseases transmitted from animals to man occur in the South, said Dr. James Lieberman, assistant chief of the training branch of the Communicable Disease Center, Atlanta, Ga., in a talk at the first regional rural health conference sponsored by the American Medical Association's Council on Rural Health last October.

Dr. Lieberman, also told the group of over 400 medical, allied medical, and farm people attending the conference that "Man frequently dissociates himself from mammalian life, forgetting that he, too, is a mammal and subject to ills of the mammalian kingdom. Yet, the relationship of animal diseases to man has been known for centuries and was recorded by ancient Egyptian, Greek, and Roman physicians." He listed the diseases frequently reported in the southeastern states most frequently as rabies, brucellosis, encephalitis, chicken mite itch, Newcastle disease, tuberculosis, tularemia, and streptococcic and staphylococcic infections.

Officially representing the AVMA at the meeting and appearing on a panel discussing "Saftey—Home, Work, Play," Dr. Martin P. Hines, Raleigh, N.C., told the group that today's farmer faces many new hazards along with the old. One of the new hazards, he said, is the administration of many dan-

gerous drugs to animals and without proper supervision and often without adequate knowledge of what they will do. He called penicillin and pesticide residues in milk possible threats to human health. He said, "It is obvious that the indiscriminate use of many of these preparations has already created problems affecting the public health. Many of them should be restricted to administration by those professionally trained in their use."

The highlight of the entire conference was the address given by Dr. Julian P. Price, chairman of A.M.A.'s Board of Trustees. Dr. Price told of the great strides made in medicine in the past 30 years, but said the nation still faces great problems. He put better health education at the top of his list of needs saying "Ignorance and apathy are our two greatest foes in the field of personal health." Dr. Price stressed the essentials of a balanced diet, the simple rules of healthy living, the danger of self-medication, and the desirability of seeking medical help early in an illness.

The A.M.A. Rural Health Conferences have been held on a nation-wide, basis annually for the past 15 years. This year, for the first time, the Council on Rural Health is holding two regional meetings in place of the national one. They hope to be able to discuss more specifically community health problems at these local meetings than could be done on a national basis. The other regional meeting will take place in Salt Lake City, Utah, May 5-6, 1961.

Wisconsin Veterinarians Study Mass Casualty Care

Realizing the assistance they, as veterinarians, could give physicians in handling patients in case of disaster, 28 Milwaukee County veterinarians have embarked on a mass casualty care course sponsored by the County of Milwaukee Civil Defense Department, Medical-Hospital Services Division.

The classes, taught by a physician assisted by members of the Civil Defense staff, are meeting weekly for ten, two and one-half hour sessions. They emphasize the role veterinarians can play in handling patients suffering from shock, hemorrhage, burns, and fractures, when physicians might be in short supply during a disaster. Training is being given through use of films, training moulages, practical demonstrations, and lectures.

Some specific subjects being covered during the class sessions are: survival plans, emergency examination and classification of injured patients, diagnosis and treatment of shock, intravenous techniques, blood pressure recording, principles of establishing and maintaining an airway, utilization of suction apparatus, tracheotomy, use of Ivy loops and Arch bars in immobilization of jaw injuries, catherization of the male patient, treatment of burns, diagnosis and treatment of fallout injuries, and emergency births in disaster. Special protection techniques against atomic, chemical, and biological warfare are also being studied.

Twenty-eight members of the Milwaukee County Veterinarians Association watch as Joseph J. Mueller, M.D., County of Milwaukee civil defense director of medical training explains the various kinds of mass casualty injuries with the use of a dummy and moulages.

This program, and others like it across the country, is in accord with an editorial commentary carried in *J.A.V.M.A.*, Feb. 1, 1960, saying that, "It may or may not be safe to presume that those responsible for planning disaster programs are aware that modern veterinary hospitals have x-ray machines, autoclaves, sterilizers, surgical instruments, otoscope-ophthalmoscopes, resuscitators, splints, dressings, bandages, drugs, and many other materials usable in the treatment of man on an out-patient basis. . . . It should be safe to predict that the physicians responsible for setting up disaster training programs will find veterinarians requiring less training than any other group in their city. The manner in which the veterinarian transfers his medical skills from domestic animals to man, the extent to which he cooperates in these local plans, and the type of relationship established with other members of the health group can do much to further inter-professional and public relations."

Veterinary-Nutrition Conference Scheduled for This Month

Veterinarians and feedmen will meet at the Hotel Continental in Kansas City, Mo., December 12-13 for the Third Annual Veterinary-Nutrition Conference sponsored by the Midwest Feed Manufacturers' Association.

Top men in both fields, including AVMA President-Elect Dr. Mark L. Morris, will give presentations aimed at furthering knowledge of efficient livestock production. The conference is also geared at promoting cooperation between feedmen and veterinarians.

The keynote address of the conference entitled "Teamwork in a Changing World," will be presented by Dr. C. B. Ratchford, extension director, University of Missouri.

One of the subjects to be discussed during the livestock production section of the program is the "Dollars and Sense of Feed Additives." This will be a panel discussion on beef cattle, swine, and poultry feed additives presented by Drs. Spencer H. Morrison, Agricon, Clinton, Iowa; Damon Catron, Walnut Grove Products Co., Atlantic, Iowa; and Rollin Thayer, poultry science department, Oklahoma State University.

Dr. Charles Norton, head of the dairy husbandry department at Kansas State University, will take "A Fresh Look at Urea in Ruminant Feeds." Dr. G. T. Easley, Sulphur, Okla., will talk on "Bovine Reproduction as Related to Nutrition."

During the session devoted to bettering relationships between veterinarians and feedmen, Dr. Jack Tumlin, McMillen Feed Mills, Decatur, Ind., will make a presentation entitled "Grass Roots Cooperation: Case Studies," and Dr. John Herrick, extension veterinarian, Iowa State University, will give a talk entitled "Togetherness?".

Other presentations scheduled for the conference are: "Vitamin A Deficiency in Cattle," by Dr. A. L. Neumann, head of the beef department, University of Illinois; "Nutritional Requirements of Specific Pathogen-Free Pigs," by Dr. Ernest R. Peo, animal husbandry department, University of Nebraska; the relationship between the livestock producing industry and Food and Drug Administration, by Dr. LaVerne C. Harold, assistant veterinary medical director, FDA; and the need and progress in developing joint and uniform management policies, by Dr. Al Gigstad, Nebraska City, Neb.

Dr. C. R. Omer Transferred by USDA

Dr. Charles R. Omer (KSU '29) has been appointed veterinarian in charge, Jefferson City, Mo., Animal Disease Eradication Station, Agricultural Research Service, USDA. He was formerly veterinarian in charge at Albany, N.Y., a position he held from Aug. 1, 1954, to Sept. 4, 1960.

Dr. Omer entered federal service in September, 1929. He was a poultry inspector with the United States Bureau of Agricultural Economics in Kansas, Illinois, Michigan, Iowa, New York, and New Jersey until 1935. Then he worked for a year on tuberculosis and brucellosis problems with the Bureau of Animal Industry in Louisiana and Maryland. From May, 1936, to March, 1937, Dr. Omer was employed as a dairy inspector in Maryland. He re-entered government service with the Bureau of Animal Industry in March, 1937, in Maryland, where he again did tuberculosis and brucellosis testing. In 1944 he was appointed assistant veterinarian in charge in Maryland. From April,

Dr. Charles R. Omer

1947, to August, 1948, he served as a district supervisor in Mexico on the foot-and-mouth disease eradication program. He was re-assigned as assistant veterinarian in charge from Baltimore, Md., to Olympia, Wash., in March, 1949. On Aug. 1, 1954, he was transferred to Albany, N.Y., as veterinarian in charge.

Dr. Omer is the author of an article entitled "Scrapie in Sheep," which appeared in the 1956 issue of the U.S. Department of Agriculture Year Book. He is a member of the AVMA, the National Association of Federal Veterinarians, and the U.S. Livestock Sanitary Association.

Dr. C. P. Hughes Gets USDA Transfer

Dr. Clinton P. Hughes (AUB '43) has been appointed assistant veterinarian in charge, Atlanta, Ga., Animal Disease Eradication Division, USDA. His appointment became effective Aug. 7, 1960. He formerly served as assistant veterinarian in charge, Baltimore, Md., from April, 1959, to August, 1960.

Dr. Hughes entered federal service in December, 1942, with the Bureau of Animal Industry. He was in charge of the brucellosis laboratory in Richmond, Va., and was engaged in field activities until 1948. From September, 1948, to June, 1955, he assisted in state-wide programs for the control and eradication of infectious and communicable diseases of livestock and poultry. Dr. Hughes served as district veterinarian at Roanoke, Va., from September, 1955, to June, 1958. He then participated in the Animal Disease Eradication Division Fourth Veterinary Administrator Development Program from

Dr. Clinton P. Hughes

June, 1958, to March, 1959, and since has received training in administrative management and civil defense. He was appointed assistant veterinarian in charge, Baltimore, Md., in April, 1959.

Dr. Hughes is a member of the AVMA, National Association of Federal Veterinarians, and Virginia Veterinary Medical Association.

Dr. W. C. Ferrall Gets Promotion and Transfer

Dr. Walter C. Ferrall (OSU '31) has been promoted to veterinarian in charge and transferred to the Hartford, Conn., Animal Disease Eradication Division, USDA. He left his former position as assistant veterinarian in charge, Boston, Mass., Aug. 7, 1960, to take on his new responsibilities.

Immediately after receiving his veterinary degree, Dr. Ferrall set up a general practice in Ohio which he maintained until 1934. His federal service began with the Bureau of Animal Industry in Ohio in

Dr. Walter C. Ferrall

1934, where he worked as a field veterinarian on tuberculosis and brucellosis until 1952. He was then appointed assistant veterinarian in charge at the Little Rock, Ark., station. From 1954 until he received his new appointment, Dr. Ferrall was assistant veterinarian in charge in Boston, Mass.

Dr. Ferrall has received special training in differential diagnosis of vesicular diseases and has devoted considerable time to the vesicular exanthema eradication program in the investigation and diagnosis of suspected cases of vesicular diseases. He also has received training in radiologic defense and radiologic monitoring for instructors.

He is a member of the AVMA and the Massachusetts Veterinary Association.

Dr. H. E. Schaulis to Work in Civil Defense Mobilization for USDA

Dr Harry E. Schaulis (KSU '29) was transferred from the Agricultural Research Service and appointed as a regional liaison representative for the USDA on Feb. 1, 1960. He is one of eight assigned to the regional offices of the Civil and Defense Mobilization.

In his new position, Dr. Schaulis will coordinate the activities of agriculture with the OCDM Region 7 office at Santa Rosa, Calif. He will be working with the Foods and Materials Division of the Commodity Stabilization Service. This office coordinates all USDA defense planning within the Department of Agriculture.

Dr. Schaulis served as veterinarian in charge of animal disease eradication activities at Denver, Col., since July, 1949.

Following graduation from veterinary school, he entered private veterinary practice at Clay Center, Kan. In 1937, he accepted appointment as a junior veterinarian with the Bureau of Animal Industry and

Dr. Harry E. Schaulis

was assigned to the brucellosis and tuberculosis programs in Kansas. In 1947 he was transferred to Mexico where he served as a district supervisor in the Cooperative Mexican-American Program for the eradication of foot-and-mouth disease.

Dr. Schaulis is a member of the AVMA, the National Association of Federal Veterinarians, and the U.S. Livestock Sanitary Association. He is currently president of the Intermountain Veterinary Medical Association.

Dr. O. J. Halverson Promoted, Transferred

The promotion and transfer of Dr. Orville J. Halverson (WSU '38) to veterinarian in charge of animal disease eradication activities at Helena, Mont., became effective

Dr. Orville J. Halverson

Aug. 21, 1960. He was formerly assistant veterinarian in charge, Salem, Ore.

Dr. Halverson entered federal service in 1938 with the Bureau of Animal Industry, and worked in Montana and Washington until 1941. He served in the U.S. Air Force from 1941 to 1946 and returned to the Bureau of Animal Industry in 1946. He then worked in Washington, Utah, North Dakota, Wyoming, Arizona, and Oregon.

He is a member of the AVMA, National Association of Federal Veterinarians, Oregon State Veterinary Medical Association, and Willamette Valley Veterinary Medical Association.

Student Veterinarian Trainee Examinations Announced by USDA

The United States Department of Agriculture has recently contacted junior veterinary students regarding the availability of summer employment with the Department.

Applications were distributed and Civil Service Examinations for appointments were set up.

Student trainee veterinarians will enter USDA service with a grade of GS-7 and a per annum salary of $5,355. This is an increase over last year's per annum salary of $4,980 offered to the students.

Veterinarians wishing to continue working in federal service after graduation will be promoted to GS-9 and given a per annum salary of $6,435. The former yearly salary given graduate veterinary students was $6,135. The veterinarian returning to federal service after graduation is also reinstated without further examination and given a full year's credit toward retirement.

Travel Grant Awaits Best Paper for World Poultry Congress

A $1,000 travel grant awaits the poultry scientist who submits the best paper for presentation at the 12th World's Poultry Congress scheduled for Australia in August, 1962.

Dr. H. R. Bird, University of Wisconsin, who is in charge of papers for the U.S. Participation Committee, says the award is being provided by the Poultry Science Association.

The recipient must be a member of the association and not over 45 years of age. His paper must be submitted by July 15, 1961.

A title and synopsis of the papers in competition must reach Dr. Bird by June 1, 1961. The full paper must reach him by July 15 for judging.

Among the States and Provinces

California

MID-COAST V.M.A. ELECTS NEW OFFICERS.—Officers elected by the Mid-Coast V.M.A. in October are: Drs. John Carricaburu (COL '44), Santa Yenz, president; Jack McMurray (COL '53), Santa Maria, vice-president; and W. Matulich (COL '51), San Luis Obispo, secretary-treasurer.

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NEW OFFICERS ELECTED BY CALIFORNIA V.M.A.—Dr. E. R. Braun (WSU '29), a general practitioner from Hanford, has been installed as president of the California V.M.A.

Other new association officers are: Drs.

Dr. E. R. Braun, new California V.M.A. president.

E. H. Houchin (WSU '24), Ventura, president-elect; R. L. Collinson (COL '45), Los Altos, first vice-president; W. W. Putney (AUB '43), Van Nuys, second vice-president; W. E. Steinmetz (WSU '39), Sacramento, third vice-president; and I. M. Roberts (MSU '41), Oakland, treasurer.

Colorado

COLORADO STATE UNIVERSITY'S STUDENT CHAPTER OF AVMA WINS SWEEPSTAKES TROPHY.—The Student Chapter of the AVMA at Colorado State University won, for the third consecutive year, the trophy for the best float at the University's annual celebration. The trophy will be on permanent display in the Student Chapter's trophy case.

The 35 foot, award-winning float contrasted the change in veterinary practice in the last 50 years. It showed a longhorn steer getting an injection from the typical veterinarian of 50 years ago, and a monkey aboard a rocket receiving a auscultation from the veterinarian of today. The float carried the title "Same Doc—New Shot." It was prepared, as is the tradition, by the sophomore class of the veterinary school.

Quite a change in the practice of veterinary medicine in the last 50 years! This observation won the trophy for the best float for the Student Chapter of AVMA at Colorado State University's 50th annual celebration.

Connecticut

UNIVERSITY OF CONNECTICUT RECEIVES FUNDS FOR SCHOLARSHIP HONORING DR. JOHN D. WINN.—About $850 has been received toward the establishment of a scholarship honoring former University of Connecticut professor and pathologist John D. Winn, D.V.M., the fund raising committee has announced.

The contributions have come from poultrymen in Connecticut and other East Coast states, grain companies, hatcheries, pharmaceutical houses, and the Connecticut Veterinary Medical Association.

The committee's eventual goal for the fund is from $1,000 to $1,500. If enough funds are received the scholarship will remain active for five to ten years.

Florida

FLORIDA V.M.A. HOLDS TRANSCONTINENTAL DISCUSSION AT ANNUAL MEETING.—"Party Line U.S.A.," a discussion of canine distemper carried to audiences in various parts of the nation through a transcontinental telephone hookup, highlighted the 31st Annual Meeting of the Flordia State V.M.A. in Jacksonville, Oct. 9-11, 1960.

Dr. David L. Coffin, Margaret Caspary Institute for Veterinary Research, New York, N.Y., began the hour-long discussion in Jacksonville. Dr. Victor Johnson, Pitman-Moore Co., then spoke from Zionville, Ind., and the panel was completed when Dr. Richard L. Ott, chairman, Department of Clinical Medicine and Surgery, Washington State University, spoke from Pullman, Wash. The discussion was transmitted to audiences in the United States over telephone loudspeakers. Duplicate slides illustrating the three presentations were shown to each audience as the discussion proceeded.

Also at the meeting, Dr. Jack O. Knowles (UP '38), Miami, was presented the association's Veterinarian of the Year award.

Officers elected are: Drs. E. L. Matthews

Dr. E. L. Matthews, president of the Florida State V.M.A.

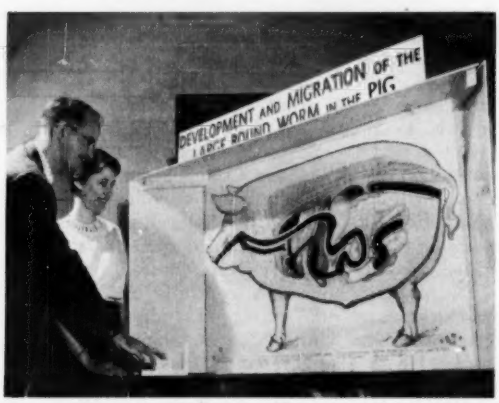
The organs most affected by seven common dog diseases are shown on the dog diseases display. It was planned by Dr. Erwin Small of the College of Veterinary Medicine and constructed by four veterinary students; Robert McKinney, John Hamm, Patrick Matchette, and Wilfred Springer.

(MSU '39), Palatka, president; A. R. Chambers (AUB '49), Jacksonville, vice-president; and R. W. Porter (AUB '44), Quincy, treasurer.

Illinois

EXHIBITS PREPARED BY UNIVERSITY OF ILLINOIS COLLEGE OF VETERINIRY MEDICINE.—Two exhibits sponsored by the College of Veterinary Medicine at the University of Illinois and the Illinois State Veterinary Medical Association were so successful at their showing at the University's annual Farm and Home Festival that they are being made available to veterinary medical and public health groups throughout the Midwest for showing.

The exhibits—one on the swine ascarid life cycle and the other on dog diseases—were prepared by the personnel of the Colleg of Veterinary Medicine.



The path of the ascarid in an animal's body is traced through the use of colored, transparent cutaway sections and a series of lights on the swine ascarid life cycle display. It was planned and constructed by Miss Virginia Ivens, instructor in the Department of Pathology and Hygiene, and Robert McKinney, a third-year veterinary medical student.

Iowa

IOWA V.M.A. APPOINTS NEW SECRETARY, MOVES OFFICES.—Dr. F. D. Wertman (ISU '40), Carlisle, has been employed as secretary-treasurer of the Iowa Veterinary Medical Association and editor of the *Iowa Veterinarian*. His appointment will become effective Jan. 1, 1961. The association's office will be moved to Carlisle at that time.

Dr. Wertman has been working as assistant secretary to the association during October, November, and December to familiarize himself with the duties of the office.

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IOWA V.M.A. LAUNCHES PUBLIC RELATIONS PROGRAM.—Under the direction of the Iowa V.M.A. public relations committee, a public relations and advertising firm in Des Moines is handling a formal public relations program for the association.

Information about the value of veterinary service, the importance of calling in a vet-

erinarian for professional diagnosis and treatment of sick animals, the contributions of the veterinary medical profession to the welfare of the nation, and special animal health problems that arise is being directed to the public through the daily and weekly newspapers, press associations, and radio and television stations in the state.

Some information that has already been disseminated to the public through these media was on rabies hazards, distemper in dogs, federal inspection of poultry, and the dangers of contracting leptospirosis when swimming in stagnant waters.

Also, as part of the public relations program for the coming year, a representative from the public relations firm will staff a public relations booth at Iowa's annual convention. From this booth he will assist newspaper, farm magazine, radio, and television newsmen covering the convention. The representative will also be available to discuss public relations problems with individual Iowa V.M.A. members and public relations chairmen of constituent groups.

Kansas

VETERINARY MEDICINE WEEK PROCLAIMED BY GOVERNOR.—Kansas Governor George Docking proclaimed the week of October 17 to 22 Veterinary Medicine week in Kansas.

In his proclamation, Governor Docking paid special tribute to the veterinary profession "in recognition of its outstanding record, its devotion to duty, and its many daily tasks in protecting and safeguarding animal health."

The Governor also called attention to the fourth annual Veterinary Medicine Open House at Kansas State University, Manhattan, October 22. The event always is a highlight of Veterinary Medicine week in Kansas, and veterinary practitioners from all over the state are invited to attend.

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KANSAS STATE UNIVERSITY CONFERS FIRST PH.D. DEGREE IN VETERINARY PATHOLOGY.—Kansas State University will confer its first doctor of philosophy degree in veterinary pathology in January on Dr. Ganti A. Sastry, a native of India.

Dr. Sastry, a professor of veterinary pathology at Andhra Veterinary College, Tirupati, was sponsored by the International Cooperation Administration to come to the United States for special advanced training.

Dr. Ganti A. Sastry, recipient of KSU's first Ph.D. degree in veterinary pathology, examines a dog with Dr. Embert H. Coles, KSU's Department of Pathology, in his study of certain bacterial canine nephritides

Although he will receive his degree in January, Dr. Sastry has already joined his family in India. He has been away from his wife and four children for three years while studying in the United States.

Under the Kansas State-ICA-India contract program, operating since 1956, 20 educators and administrators of India's colleges and universities are sent to Kansas State each year for advanced work. Although Indian students normally are at Kansas State for only one calendar year, Dr. Sastry showed such promise in his work that he was permitted to continue his study toward a Ph.D. degree. He received his master's degree a year ago.

At Kansas State, Dr. Sastry studied certain bacterial canine nephritides under Dr. E. H. Coles (KSU '45). This research was supported by a grant from the Mark L. Morris Foundation for Animal Health.

Since 1954 Dr. Sastry has been associated with Andhra Veterinary College, one of the new institutions in India. The college has about 100 students, and its research facilities have been improved through equipment provided through the ICA-India contract.

Dr. Sastry hopes to continue research work he was performing in India before coming to the United States when he returns. He is also interested in working on such diseases as horn and eye cancer and unknown diseases afflicting Indian animals.

Michigan

DR. ROBERT F. WILLSON APPOINTED SECRETARY, DETROIT BOARD OF HEALTH.—Dr. Robert F. Willson (MSU '36) has been appointed

secretary and administrative assistant to the Detroit Board of Health.

He began his employment with the Department 24 years ago as a veterinary meat inspector. Later he was promoted to senior veterinary inspector in charge of animal disease control and assigned to the municipal dog pound. Dr. Willson left that position when he was promoted to assistant chief veterinarian. For the past 14 years, he has been director of the Bureau of Food Sanitation.

Dr. Willson is the executive secretary of the Michigan V.M.A., past-president of the Michigan Public Health Association and the Southeastern Michigan V.M.A., and a charter member of the American Board of Veterinary Public Health. He holds memberships in the AVMA., the American Public Health Association, the International Association of Milk and Food Sanitarians, and the Royal Society of Health.

Dr. Robert F. Willson

He is the author of approximately 15 papers published in various professional journals, and is chairman of the Michigan State Board of Veterinary Examiners.

Missouri

STUDENT CHAPTER OFFICERS ELECTED.—New officers for the fall semester of 1960 of the Missouri Student Chapter of the American Veterinary Medical Association are: John Rhoades, president-elect; Douglas Hoback, vice-president; Creighton Cornell, secretary; Joe Wendling, treasurer.

The group's faculty advisor is Dr. George C. Shelton (TEX '48).

New York

NEW YORK NAMED MODIFIED CERTIFIED BRUCELLOSIS FREE STATE.—Dr. C. F. Mingle, veterinarian in charge of Brucellosis Eradication for the USDA, awarded New York state a certificate naming the state modified certified brucellosis free at the meeting of the New York State Veterinary Medical Society, September 16, in Syracuse.

The New York brucellosis eradication program is directed by the Division of Animal Industry of the Department of Agriculture and Markets. The state will now work toward its brucellosis-free certification.

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PUBLIC RELATIONS SOURCE MATERIAL AVAILABLE TO NEW YORK VETERINARIANS.—When New York veterinarians are called upon to appear on radio or television or to speak before any lay groups in their community, they can accept these invitations without worrying about the subject matter they will present.

They know that the committee on public information of New York State V.M.S. has prepared radio scripts, slide talks, and speaker's kits and gathered reprints, booklets, and film catalogs to arm veterinarians with worthwhile material for such occasions.

New York veterinarians have at their fingertips 52 livestock interviews, 12 small animal interviews, slide talks on mastitis, career opportunities and education, infertility in cattle, and the dog and the family, and speaker's kits on veterinary medicine in our modern world, rabies, and veterinary feed relations.

Reprints on ten different subjects and booklets on three more are available to them for distribution to the groups before which they speak.

And to get all of this material, all the potential speaker has to do is write to the New York State Veterinary Medical Society offices.

Nova Scotia

NOVA SCOTIA V.M.A. APPOINTS COMMITTEE TO STUDY INDISCRIMINATE USE OF DRUGS—

ANTIBIOTICS.—A committee to investigate the dangers of indiscriminate use of drugs and antibiotics was appointed by the Nova Scotia V.M.A. at their 48th annual meeting in Kentville last October.

The association set up the committee to curb the growing problem of use of these products by nonqualified persons. The problem has recently been intensified in the area by the sale of drugs and antibiotics to laymen by nonprofessional people.

Officers elected at the meeting are: Drs. A. Ross Mitton (ONT '52), president, R. B. O'Brien (ONT '30), vice-president; and K. W. Trenholm (ONT '52), secretary-treasurer.

The purpose of the Animal Health Emergency Organization were outlined by the association's guest speaker, Dr. H. E. Knapp (ONT '40), Moncton, N.B., federal district veterinarian for Maritime Provinces.

Other committees were named at the meeting to draft association bylaws and a policy manual.

Pennsylvania

KEYSTONE V.M.A. DISCUSSES TELEPHONE DIRECTORY LISTING OF "ANIMAL HOSPITALS."—At the Keystone V.M.A. meeting October 26, the association decided to refer the subject of veterinary hospital listings in the classified section of the telephone directory under the heading "Animal Hospitals" to the Committee on Ethics of the Pennsylvania V.M.A. for further consideration.

Also at the meeting, Dr. Robert Brodey (ONT '51) of the School of Veterinary Medicine, University of Pennsylvania, presented an illustrated talk entitled "Evaluation and Management of Trauma Cases," and a film entitled "The Uses of Hemostop" was shown.

The meeting was held in the student lounge at the School of Veterinary Medicine, University of Pennsylvania.

Quebec

VETERINARY SCHOOL IN QUEBEC APPOINTS COMMITTEE TO STUDY INDISCRIMINATE USE OF DRUGS.—The College of Veterinary Medicine of the Province of Quebec has appointed a six-member committee to study indiscriminate use of drugs in the province.

The committee will study specifically the sale of commercial feed with added antibiotics, the addition of drugs to poultry feed, and the use of drugs on animals by nonprofessional persons.

Upon completion of the study, the college plans to urge legislation in the province to prevent unqualified persons from dealing with drugs and antibiotics in matters of animal health.

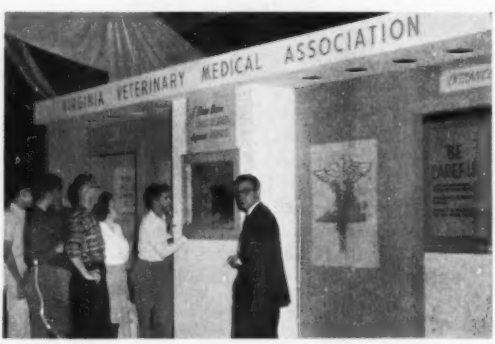
The college also hopes the study will show the people of the province that veterinarians are aware of their public health responsibilities and are doing their part to maintain sound health standards.

Committee members are: Dr. Lucien Cournoyer, president of the college; Dr. J. D. Nadeau, college faculty member; Dr. Pierre Cayouette, veterinary laboratory of the Department of Agriculture of Quebec, Dr. Paul H. Marois, head of the veterinary section of the Institute of Microbiology and Hygiene, University of Montreal; Dr. Edouard Breton, vice-president of the college and practitioner at Warwick; and Dr. Raymond Breault, practitioner at Bedford.

Virginia

VIRGINIA V.M.A. SHOWS EXHIBIT ON RABIES.—An estimated 200,000 people visited the exhibit shown by the Virginia Veterinary Association at the Atlantic Rural Exposition September 22 to October 1 in Richmond.

The exhibit showed the relationship of the wild animal to the pet in carrying rabies



People and the pup stare at each other at the exhibit prepared by the Virginia V.M.A. and shown at the Atlantic Rural Exposition. The sign on the right reads "Be Careful . . . Never approach an animal—wild or domestic—acting abnormally. Remember wild life usually runs from you. Symptoms of an infected animal vary from violence to dullness." The exhibit had a rabies theme.

in some sections of Virginia. To give the exhibit animation and additional interest, a small pup was placed in the center front section. A squirrel, a coon, and a skunk were shown on the inside of the exhibit.

Veterinary Military News

Nuclear Veterinary Course at Walter Reed

Ten Army and Air Force veterinarians have recently completed a two-month postgraduate course in "Examination for Radioactive Contamination of Foods" at Walter Reed Army Institute of Research.

The course was planned to train veterinary officers in detection of radiation in foods and in basic techniques for the use of radioactive isotopes in diagnosis and research. Background information was presented in the fields of mathematics, nuclear physics, tracer chemistry, radiation biology, and radiologic safety and instrumentation.

Fifty experts from the Armed Forces, Atomic Energy Commission, Department of Health, Education and Welfare, and Office of Civil Defense Mobilization taught the course.

The student veterinarians were: First Lt. Ralph L. Cheney, First Lt. Walter A. Christensen, Capt. Edgar H. Eckermann, First Lt. Ross A. Kuttler, First Lt. LeRoy F. Erickson, Lt. Col. Roy E. Kyner, First Lt. Phillip A. Linerode, Capt. Stewart J. McConnell, First Lt. Elmer R. Reich, and Major James B. Young.

State Board Examinations

ARIZONA—Jan. 18-19, 1961, University of Arizona, Tucson, Ariz. Dr. William E. Snodgrass, Secretary, Route 2, Box 373, Glendale, Ariz.

NORTH CAROLINA—Jan. 26-27, 1961. Carolina Hotel, Raleigh, North Carolina. Dr. James I. Cornwell, secretary, P.O. Box 9038, Asheville, N.C.

TEXAS—Jan. 28-29, 1961, Rice Hotel, Houston, Texas. Applications must be received 30 days before examination. Dr. T. D. Weaver, Executive Secretary, 207 Capital National Bank Building, Austin 16, Texas.

Deaths

Star indicates member of AVMA

Daniel E. Baughman (CVC '92) 93, Fort Dodge, Iowa, died July 8, 1960.

Dr. Baughman was one of the founders of the Fort Dodge Laboratories and had served as president of the Iowa V.M.A. in 1908.

Irvin E. Blosser (KVC '09), 74, of Marshall, Mo., died Nov. 18, 1959. He had been in failing health for the past two years.

After graduation from KVC, Dr. Blosser had been associated with Dr. William B. Welch (KVC '08) in a general practice for three years. In 1912, he moved to Malta Bend, Kan., to operate the family farm and conduct a practice. He remained there until the time of his death. He was a member of the Missouri and the Central Missouri V.M.A.'s.

Peter F. Burnette (AUB '40), 49, Miami, Fla., died Sept. 26, 1960.

Dr. Burnette had moved to Miami from Tampa 12 years ago.

William M. Burson (CIN '07), 86, Athens, Ga., died in September, 1960.

Dr. Burson had maintained a general practice in Athens and taught several courses in veterinary medicine at the agricultural school there. He was one of the pioneers in in the field of animal husbandry in Georgia.

John H. Castor (UP '14), 67, Corry, Pa., died Sept. 1, 1960, after having undergone an emergency appendectomy a few days before.

Dr. Castor was chairman of the board of the Sterling Milk Co., Erie, Pa., which he had founded in 1931. He had conducted a general veterinary practice for only five or six years immediately following his graduation from veterinary college. He then became interested in other fields of work.

Women's Auxiliary

Delaware

WOMEN'S AUXILIARY ADOPTS COMMUNITY PROJECT.—Participation in community activities by veterinarians has been incorporated into the AVMA Principles of Veterinary Medical Ethics and urged not only on the national level, but on state and local levels as well. The Women's Auxiliary to the AVMA in Delaware has followed through on the idea by deciding to help with a community project themselves, knowing that their activities reflect upon their veterinarian-husbands.

At their last meeting the women heard a representative of the Salvation Army explain the work of that group and what the auxiliary can do to help.

The women agreed to make gifts and prepare Christmas baskets for the Salvation Army as an auxiliary project. Individual auxiliary members volunteered to dress dolls for Christmas.

s/MRS. HOBART HARE, *publicity*

Illinois

NORTHERN ILLINOIS AUXILIARY MEETS.—At their fall meeting September 28, the Women's Auxiliary of the Northern Illinois Veterinary Medical Association voted to contribute to the AVMA Student Loan Fund and the AVMA Research Fund.

Officers elected at the meeting are: Mrs. C. H. Larson, Shabbona, president; Mrs. M. W. Moore, Belvidere, president-elect; Mrs. H. S. Fike, McHenry, secretary-treasurer-elect; and Mrs. Marlin Kleckner, Pearl City, executive board member-elect.

Mrs. E. G. Hannan, Maple Park, presented a report on the Women's Auxiliary to the AVMA meeting in Denver last August.

Washington

AUXILIARY MEETS.—The budget adopted at the Eleventh Annual Meeting of the Women's Auxiliary of the Washington State V.M.A. provided for the allocation of funds for books for the Washington State University veterinary library, and contributions to the Washington State University veterinary student loan fund, the AVMA Research Fund, and the Women's Auxiliary to the AVMA student loan fund.

The meeting was held at the Olympic Hotel in Seattle, August 29-30.

Life memberships in the association were granted to Mrs. E. E. Wegner, Seattle, and Mrs. Peter MacIntosh, Yakima.

New officers elected are: Mrs. T. J. Guilfoil, Seattle, president; Mrs. John Gorham, Pullman, president-elect; Mrs. William Tavener, Cheney, secretary; and Mrs. Thomas Pelley, Opportunity, treasurer.

s/MRS. P. S. MILLARD, *Editor*

West Virginia

WOMEN'S AUXILIARY ELECTS NEW OFFICERS.—New officers elected at the meeting of the Women's Auxiliary to the West Virginia V.M.A. at their meeting September 26 are: Mrs. Thomas P. From, Petersburg, president; Mrs. R. H. Frilen, Beckley, vice-president; Mrs. John Spanabel, Fairmont, secretary; Mrs. Leo J. Meyer, Martinsburg, treasurer; Mrs. Harry J. Fallon, Huntington, public relations media chairman; and Mrs. V. H. Miller, Charleston, historian. Mrs. Thomas P. From and Mrs. Leo J. Meyer were also elected delegates to the Women's Auxiliary to the AVMA meeting in Detroit, 1961.

Projects of the auxiliary for the coming year will be working with the West Virginia V.M.A. to attain the goal of $287.30 for the AVMA Research Trust Fund, contributing to the AVMA Student Loan Fund, and placing the pamphlet "Veterinary Medicine as a Career" in all high schools of the state.

Wisconsin

NORTHEASTERN WISCONSIN V.M.A. AUXILIARY CONTRIBUTES $25 TO STUDENT LOAN FUND.—Meeting in conjunction with the 23rd annual meeting of the Northeastern Wisconsin V.M.A., the auxiliary voted to contribute $25 to the Student Loan Fund.

Auxiliary officers elected to serve for the coming year are: Mrs. Burke Robinette, Coleman, president; Mrs. Elvin Prather, Manawa, vice-president; Mrs. Robert Birr, Pulaski, treasurer; and Mrs. William Madson, Appleton, secretary.

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Henry and Blackburn[2] report that in a controlled clinical study of calf scours treated with FURAMAZONE, "of the 63 treated calves only three died, while 21 of the 24 untreated controls succumbed."

The safety of FURAMAZONE has been well established in extensive toxicological studies. It is nontoxic even when given for prolonged periods of time in doses well above therapeutic levels.

References: 1. Osborne, J. C.: New Horizons in Chemotherapy: Proceedings of The First Regional Conference on the Nitrofurans in Veterinary Medicine, June 5, 1958. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med. 52:122 (Mar.) 1957.

WHAT IS YOUR Diagnosis?

Make your diagnosis from the pictures below — then turn the page

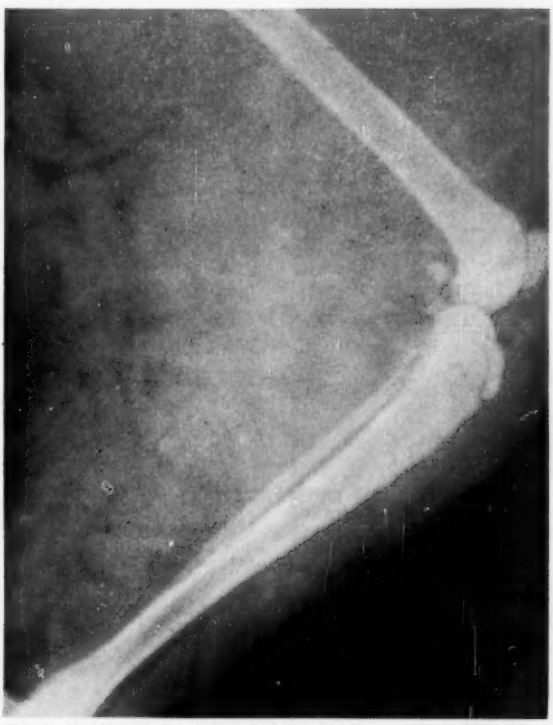

Fig. 1—Radiograph, medial recumbent view of the left hindleg of a cat.

History.—A male cat, 1½ years old, developed a fluctuating, tense, nonsensitive swelling on the medioposterior aspect of the left hindlimb, extending from the pubis to the hock. A small scab was present on the lateral surface of the hock and, when it was removed, 4 oz. of serosanguineous fluid was expelled. Draining the fluid did not reduce the swelling and a medial radiograph was taken of the leg (fig. 1).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Femoral hernia. On the radiograph, protrusion of the small intestine could be identified as extending from the ring of the femoral canal to the hock.

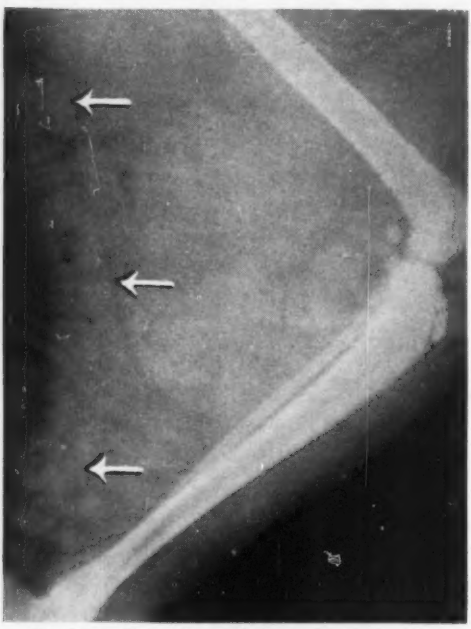

Fig. 2—Radiograph, medial recumbent view of the left hindleg of a cat. The small intestine (arrows) can be seen extending from the femoral canal to the hock.

Comment.—The hernial sac with intestine enclosed extended from the femoral ring to the hock. The hernial sac was formed as the weight of the intestine separated the skin and the fascia on the medial and posterior side of the leg down to the hock. The strangulated loop of intestine was returned to the abdominal cavity by means of laparotomy, and the femoral canal was sutured. The cat recovered satisfactorily, but it was necessary to drain the hernial sac at the hock several times before healing in the leg was complete.

Femoral hernias are rarely reported in animals. The femoral canal starts in the ventral posterior abdominal cavity; it lies between the belly of the sartorius muscle cranially, the pectineus and adductor muscles caudally, the iliopsoas and vastus medialis muscles laterally, and the femoral fascia and skin medially. The canal normally contains, among other structures, the femoral artery and vein which are surrounded by adipose and connective tissues.

This case was presented by Emilio Estrada, D.V.M., West Haven, Conn., and was prepared with the assistance of Wayne H. Riser, D.V.M., M.S., Kensington, Md.

Our readers are invited to submit histories, radiographs and diagnoses of interesting cases which are suitable for publication.

Quiz for Quidnuncs

1. How may electrolyte deficits due to diarrhea and anorexia be repaired? Page 642.

2. What advantages does indirect ophthalmoscopy offer in veterinary medicine? Page 648.

3. Can horses be immunized against botulism? Page 653.

4. How effective is cyanacethydrazide in the treatment of swine lungworms? Page 656.

5. What new compound has been found effective in treatment of urinary calculi in feedlot cattle? Page 667.

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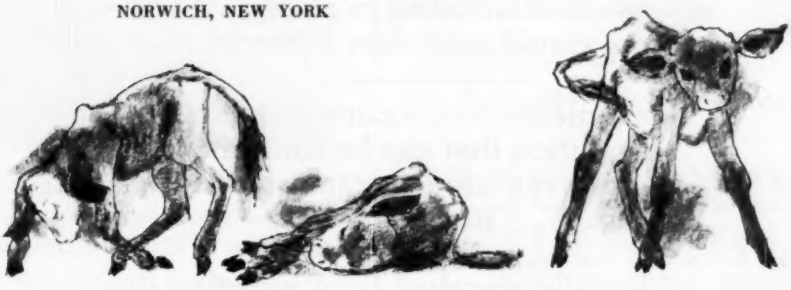

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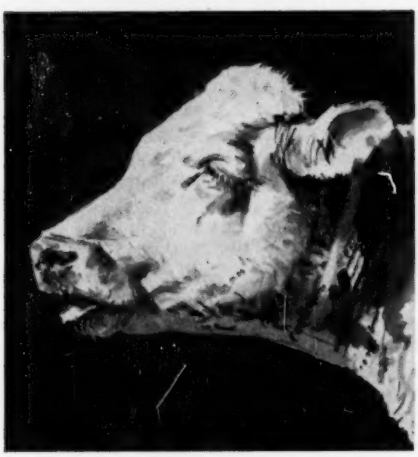

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History of the AVMA

1899

At the meeting in 1899, held at the Academy of Medicine in New York City, President A. W. Clement observed: ". . . . the veterinarian may claim a close brotherhood with the practitioner in human medicine and both professions by working harmoniously can do much to advance the public health . . . ."

That Dr. Clement perhaps envisioned a broader scope of the newly-renamed Association than was intended is suggested by his concept of it "embracing in its field the United States, Canada and Mexico, nay, even more, the whole Pan-American Continent." While there is considerable latitude in the connotation of "American," it is evident that this broad concept of the inter-relationship of the veterinary professions of the Western Hemisphere did not become a reality until the establishment of the Pan American Congress of Veterinary Medicine in 1951. *De facto* recognition of Canada as a full partner, however, was long overdue. The following year six Canadians joined the AVMA, more than doubling the Canadian membership, and Fred Torrance of Winnipeg was elected vice-president of the Association. Of the 48 new members in 1900, 18 were from the Ontario and McGill schools.

In delivering "A Plea for the More General Use of Anesthesia in Veterinary Surgery," J. P. Turner charges: ". . . we see some veterinary surgeons still pursuing the methods of the ancients . . . and the feeling still exists, largely among the laity, that we are a hard-hearted profession." In a more optimistic note on "The Veterinarian of the Future," N. S. Mayo asks: ". . . who is there to-day who dare pronounce upon the progress in veterinary science that the next 50 years will bring forth?" Dr. Mayo, who lived to see the next 50 years and more (died in 1958), states his credo: "I believe that the veterinarian of the future must choose his profession from high and noble motives, not for the financial interest alone but because he shall love to alleviate the suffering and assuage the pain of those who cannot speak. I believe that the secret of success of the veterinarian of the future will lie in the education he must have . . . the education of the veterinarian of the future should be broad, liberal and scientific."

The clinical program, held at the American Horse Exchange, included a repeat of the vaginal ovariotomy by W. L. Williams, who had performed the same operation the previous year, median neurectomy by C. E. Clayton of the New York American Veterinary College, resection of the lateral cartilage for quittor by G. H. Berns, and spaying of a pregnant bitch by W. L. Williams.

Leonard Pearson was elected president of the Association; Sesco Stewart and W. H. Lowe were re-elected secretary and treasurer, respectively.

✦ ✦ ✦

LEONARD PEARSON was born in Evansville, Ind., Aug. 17, 1868. He was graduated with a B.S. in agriculture from Cornell in 1888, and received his V.M.D. from the University of Pennsylvania in 1890, following which he studied in Germany for a year. On his return he rejoined the university staff, becoming professor of veterinary medicine in 1894 and dean in 1897. In 1908 he was awarded an honorary Doctor of Medicine degree. In 1892 he conducted the first tuberculin test in America, and in 1895 introduced the "Pennsylvania plan" of voluntary testing which gained acceptance where compulsory plans had failed. In 1908 he diagnosed Johne's disease for the first time in America.

Dr. Pearson served as president of the Pennsylvania V.M.A., and as secretary (1894-95) and president (1899-1900) of the AVMA. He served on several important congresses on tuberculosis, and was named state veterinarian (Pa.) in 1895. He died on Sept. 20, 1909, at the age of 41.

Dr. Leonard Pearson, AVMA President from 1899 to 1900.

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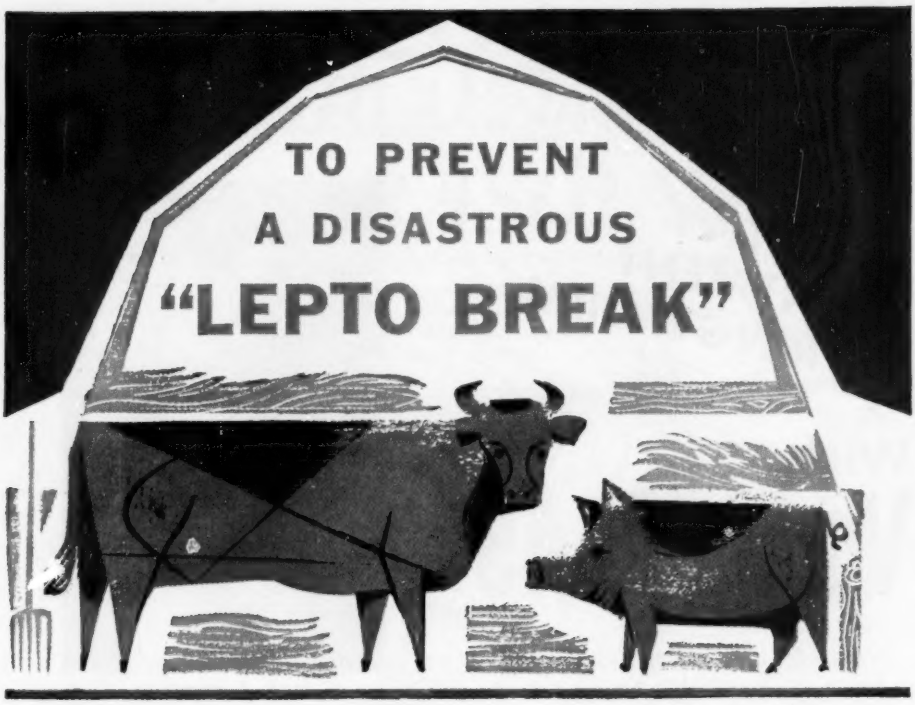

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Dr. D. C. Maplesden (ONT '50) was appointed veterinary director of Stevenson, Turner and Boyce Limited.

Dr. D. C. Maplesden

After receiving his veterinary degree, Dr. Maplesden practised for three years in Ontario and in Texas. In 1953 he returned to the Ontario Veterinary College to organize the farm service and teach in the Department of Medicine and Surgery. He obtained his masters degree from Ontario Agricultural College and his Ph.D. in nutrition at Cornell University.

California Cows Are World's Second Highest Producers

Production per cow on a world-wide basis for the top 14 countries ranged from a high of 9,079 lb. per cow in the Netherlands in 1959 to an average of 4,454 lb. per cow in France. The United States ranked sixth with an average of 6,438 lb. per cow. California's production average per cow in 1959—8,950 lb.—was a close second to high-producing Netherlands' cows and was well ahead of second-place Denmark's and third-place Belgium's.—*Calif. Farmer, 123, (Aug. 20, 1960): 134.*

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Trend to Fewer Farms Continues

USDA economists anticipate a continued trend toward fewer and larger farms. They predict a percentage reduction in the number of commercial farms between 1954 and 1975 at about the same rate as occurred between 1935 and 1954—28 per cent.

These economists also see the average acreage per farm increasing more than one-half during the same years.

They believe that 1975 needs for farm products can be met with no more acres of cropland equivalent nor of total land in farms than have been used in the last few years.—*USDA, (July, 1960): 3.*

Strongyloides Dermatosis Reported in a Dog

A condition resembling allergic dermatosis in a Beagle was found to be caused by nematode larvae of *Rhabditis strongyloides*. The parasite was isolated from skin scrapings.

Lesions were manifested as numerous erythematous wheals on the glabrous part of the abdomen and inguinal regions. No well-defined pustules or papules were present. The extremities of all 4 limbs were reddened and wet as a result of the dog's biting at these areas.

Maintained in a clean, dry environment, the dog's condition did not improve. After two weeks, a preparation containing gentian violet and trypan blue was applied topically for 2 days. It seemed to have little value. At the beginning of the fourth week, a 50 per cent solution of ronnel (Trolene) in propylene glycol was applied topically for 3 days. The propylene glycol acted as a severe astringent and resulted in the skin's becoming dehydrated and thin and leathery in texture. An emollient was applied to improve skin texture. At the end of the week, numerous skin scrapings yielded only 2 dead larvae. The dog's subsequent recovery was uncomplicated.

Use of straw as bedding material was considered a factor in this case because it is believed that the straw may harbor the nematodes. Warmth of the dog's body and the presence of moisture caused the parasites to become viable and enter abraded skin.—*Canad. Vet. J. (March, 1960): 111.*

News from Merck...

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PROLONGED ACTION: Ordinary sulfonamides, including sulfathiazole and sulfamethazine, peak during the first 24 hours after treatment, but then soon fall below the necessary or effective 5 mg./100 cc. level. Not so with SULFABROM SOLUTION or SULFABROM BOLUSES. They can establish and maintain therapeutic blood and plasma levels *for as long as 48 hours* in cattle.

DOSAGE AND ECONOMY: Recommended treatment levels with new SULFABROM SOLUTION are 25-50 cc. per 100 lb. of body weight when injected intravenously and 50 cc. per 100 lb. of body weight when injected intraperitoneally. Cost of treatment per animal is remarkably low —only about 50¢ to $1.

RESULTS: The following remarks are abstracted from actual clinical investigation reports on the use of SULFABROM SOLUTION on file at the Merck Animal Science Research Department. (1) "*Symptoms:* Recently shipped-in cow. Temperature 106°. Labored breathing. Rales audible over chest area. *Diagnosis:* Pneumonia (shipping fever complex). *Treatment:* 700 cc. SULFABROM SOLUTION in one dose daily for two days. Sixty grams of SULFABROM BOLUSES given at time of I. V. injection. *Results:* Temperature returned to normal in 24 hours". (2) "*Symptoms:* Dystocia with removal by forced extraction of putrefied fetus. Temperature 104°. Rapid pulse and breathing. Anorexia. *Diagnosis:* Metritis. *Treatment:* Two doses SULFABROM SOLUTION 700 cc. each. *Results:* Temperature 101.6° in 24 hours. Appetite returning". (3) "*Symptoms:* Foul hoof—limited to 'between the toes' variety with swelling. *Diagnosis:* Foot rot. *Treatment:* 700 cc. SULFABROM SOLUTION. *Results:* Eight of 11 animals walked normally in 48 hours with swelling reduced to normal or near normal. Three animals required second treatment and returned to normal in 48 hours".

These quoted reports are typical of those being received from clinical investigators and veterinarians. We believe they demonstrate that *the only sulfas available to you exclusively*—new SULFABROM SOLUTION and SULFABROM BOLUSES—are also the most effective you can use.

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MERCK

Frank Jacobs Named President of Jen-Sal Laboratories

Frank T. Jacobs, former vice-president of the Wm. S. Merrell Co. of Cincinnati, Ohio, pharmaceutical drug subsidiary of Richardson-Merrell Inc., has been selected president and general manager of Jensen-Salsbery Laboratories, Inc., of Kansas City, veterinary drug subsidiary of the company. Richardson-Merrell was formerly the Vick Chemical Company.

Mr. Jacobs joined Merrell in 1934, was vice-president in charge of marketing and, more recently, vice-president in charge of new business development. Dr. Vladimir Dvorkovitz, former president of Jensen-Salsbery, is now a special assistant to H. R. Marschalk, executive vice-president of Richardson-Merrell.

"My Ankles are Weak!"

—UPI Photo

Miss Fluff Puff, a 2-year-old Toy Poodle, tries out her ice skates with encouragement from her mistress, Mrs. Kit Cline Outland, a former world and Olympic speedskating champion.

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

VERGATI, FRANCESCO

Viale Trieste 61
Viterbo, Italy
D.V.M., Ontario Veterinary College, 1959.
Vouchers: James A. Henderson and James Archibald.

The Whisky Congeners

In order to compare the toxic effects of whisky and vodka congeners, respectively, an organoleptic and clinical study was conducted on a group consisting of 68 abstainers or moderate social drinkers. The comparisons were made with 2 oz. each of whisky and vodka. The congeneric content of these beverages was obtained by distilling off the ethyl alcohol.

The tests showed that the essential differences between vodka and whisky are due to their congeneric content and that the congeners in alcoholic beverages are the real culprits in producing hangovers and other undesirable reactions.

The congeners of whisky contributed to an extension or amplification of the effect of alcohol. They also caused a large number of adverse aftereffects, including bad taste sensations, gastric irritation, and resulting vasomotor responses. After consuming the same amount of alcohol in the form of vodka, these results were minimal.

In vodka drinkers, only 2 per cent were observed to have headaches; in whisky drinkers, hangover headaches, bad breath, and fatigue were observed in 27 per cent.

When alcohol is indicated for therapeutic purposes, the virtual tastelessness of vodka, its acceptability to nonalcoholics, and absence of the toxic whisky congeners present obvious advantages. *Current Therapeutic Research, 2, (Sept., 1960): 453.*

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✓ **PROTEIN** – – – – – Dogs require a minimum of 18% protein—Kasco supplies 25%! This is more than enough protein for any stage of your dog's life cycle.

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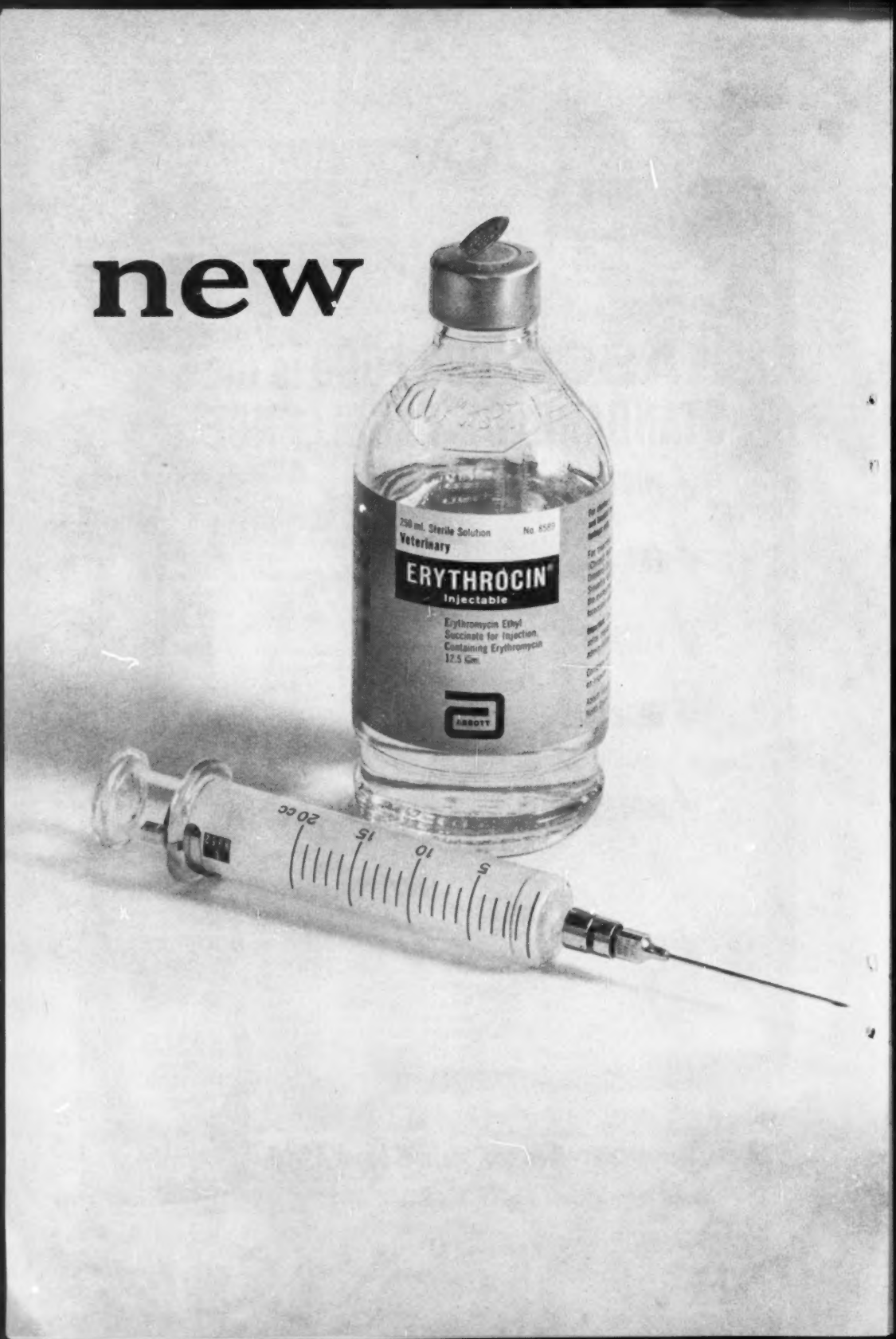
Make comparisons–then you, too, will buy KASCO

BEST FOODS DIVISION, of Corn Products Company, N. Y.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Studies have shown Erythrocin Injectable effective against staph, strep, and pneumococci—*including some strains which have become resistant to the action of other antibiotics.*

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Erythrocin has an unparalleled record of safety in use in human medicine. Clinical trials on over 1900 large and small animals indicate that Erythrocin Injectable Veterinary also has a high order of safety. In addition, there are seldom complications with Erythrocin therapy and little likelihood of resistance developing during, or as a result of, treatment.

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Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

American Animal Hospital Association. Regional Meetings. Dr. Frank R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind., executive secretary.

Region 1. Roosevelt Hotel, Pittsburgh, Pa., Jan. 15, 1961. Shoreham Hotel, Washington, D. C., Feb. 8-10, 1961. Buffalo Academy of Veterinary Medicine, Buffalo, N.Y., March 16, 1961.

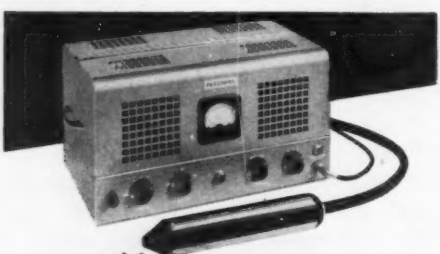
Region 2. Buena Vista Hotel, Biloxi, Miss., Feb. 11-13, 1961. Miami Regional, Miami, Fla., Feb., 1961.

Region 4. Oklahoma State University, Stillwater, Okla., Jan. 22, 1961. Texas V.M.A. Meeting, Houston, Texas, Jan. 30, 1961. Colorado State University, Fort Collins, Col., Feb. 19, 1961.

Kentucky Veterinary Medical Association. Sterility Short Course. Phoenix Hotel, Lexington, Ky., Dec. 5-6, 1960. Dr. L. S. Shirrell, 545 East Main, Frankfort, Ky., secretary.

Prince Edward Island Veterinary Medical Association. Charlottetown, Prince Edward Island, Dec. 7, 1960. Dr. George C. Fisher, 188 Prince St., Charlottetown, Prince Edward Island, secretary.

Nebraska Veterinary Medical Association. Annual Convention. Hotel Cornhusker, Lincoln, Neb., Dec. 7-9, 1960. Mr. Bob Garey, Nebraska Veterinary Medical Association, Hotel Clarke, Rooms 418-419, Hastings, Neb., executive secretary.



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American Association of Equine Practitioners. Annual meeting. Westward Ho Hotel, Phoenix, Ariz., Dec. 12-14, 1960. Dr. M. B. Teigland, 2560 State Service Rd., Opa Locka, Fla., secretary-treasurer.

Veterinary-Nutrition Conference. Sponsored by Midwest Feed Manufacturers Association and Iowa, Kansas, Missouri, Oklahoma, and Nebraska Veterinary Medical Associations. Continental Hotel, Kansas City, Mo., Dec. 12-13, 1960. Dr. James Bailey, Walnut Grove Products Co., Atlantic, Iowa, chairman.

Indiana Veterinary Medical Association. 77th annual convention. Hotel Severin, Indianapolis, Ind., Jan. 11-13, 1961. Dr. L. M. Borst, 3315 Shelby St., Indianapolis, Ind., secretary.

New York State Veterinary College. Fifty-third annual conference for veterinarians. Cornell University, Ithaca, N.Y., Jan. 4-6, 1961. Dr. George C. Poppensiek, New York State Veterinary College, Cornell University, Ithaca, N.Y., dean.

American Veterinary Radiology Society. Mid-year meeting. Hotel Severin, Indianapolis, Ind., Jan. 10, 1961. Dr. J. J. Fishler, 3421 S. Main St., Elkhart, Ind., secretary.

Intermountain Veterinary Medical Association. Thirty-third annual meeting. Newhouse Hotel, Salt Lake City, Utah, Jan. 11-14 1961. Mr. Peter B. Woolley, 306 Ness Building, 28 West Second South, Salt Lake City, Utah, manager.

Kansas Veterinary Medical Association. Fifty-seventh annual convention. Broadview Hotel, Wichita, Jan. 15-17, 1961. Dr. M. W. Osburn, Kansas State University, Division of Extension, Manhattan, Kan., secretary-treasurer.

Wisconsin Veterinary Medical Association. Forty-fifth annual meeting. Schroeder Hotel, Milwaukee, Wis., Jan. 15-17, 1961. W. J. O'Rourke, 540 W. Washington Ave., Madison 3, Wis., secretary.

Pennsylvania, University of. Sixty-first annual conference of veterinarians. University of Pennsylvania School of Veterinary Medicine, Jan. 17-18, 1961. Dr. Donald Patterson, School of Veterinary Medicine, University of Pennsylvania, program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Tenn., Jan. 22-24, 1961. Dr. H. W. Hayes, 5009 Clinton Pike, Knoxville, Tenn., secretary.

Arkansas Veterinary Medical Association. Annual meeting. Hotel Marion, Little Rock, Jan. 22-24, 1961. Thayer D. Hendrickson, 7824 Cantrell Rd., Little Rock, Ark., secretary-treasurer.

Minnesota Veterinary Medical Association. Annual meeting. Leamington Hotel, Minneapolis, Minn., Jan. 23-25, 1961. B. S. Pomeroy, 1443 Raymond Ave., St. Paul 8, Minn., secretary.

Louisiana State University. Short Course for veterinarians, Pleasant Hall, Louisiana State University campus, Baton Rouge, Jan. 24-25, 1961. Dr. R. B. Lank, Department of Veterinary Science, Louisiana State University, chairman.

Ontario Veterinary Association. Eighty-seventh annual meeting. Royal York Hotel, Toronto, Ont., Jan. 26-28, 1961. Dr. R. J. Humble, Ontario Veterinary College, Guelph, Ont., chairman.

(*Continued on adv. p.* 48)

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Return a Frolicking Pet to Its Grateful Owner: A **single** intramuscular dose generally reduces inflammation, relieves itching, and promotes repair of painful lesions in canine dermatitis.[1-3] Duration of therapeutic action is "disciplined": persists 5 to 10 days,[1,2] long enough to give these desirable results, but not so long as to cause complications. Additional injections are usually unnecessary.[1-3]

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References: 1. Pollock, S.: Vet. Med. 54:97 (Feb.) 1959. **2.** Hoffer, S. H.: Clinical report to CIBA. **3.** Weir, H. T., and Hazelrig, J. W.: Clinical report to CIBA.

ULTRACORTENOL is available at ethical veterinary distributors throughout the United States.

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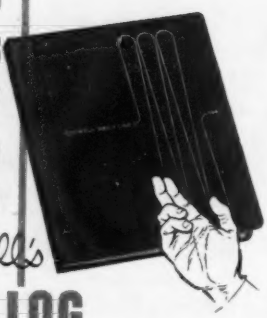

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(*Continued from adv. p. 46*)

Texas Veterinary Medical Association. Annual convention. Rice Hotel, Houston, Jan. 29-31, 1961. Dr. King Gibson, 3906 Lemmon Ave., Dallas, Texas, co-chairman.

Ohio State Veterinary Medical Association. Annual meeting. Commodore Perry Hotel, Toledo, Ohio, Feb. 5-8, 1961. Dr. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

Missouri Veterinary Medical Association. Sixty-ninth annual meeting. Hotel Statler-Hilton, St. Louis, Feb. 19-21, 1961. Paul L. Spencer, D.V.M., P.O. Box 283, Jefferson City, Mo., secretary.

Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Ill., Feb. 20-22, 1961. Dr. C. B. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Illinois, executive secretary.

Manitoba Veterinary Medical Association. Winnipeg, Manitoba, Feb. 27-28, 1961. Dr. K. Warren, Killorney, Manitoba, secretary.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., March 19-21, 1961. Dr. M. K. Heath, School of Veterinary Medicine, Auburn, Ala., secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U. S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.

Grant Given for Mastitis Control Study

American Cyanamid Co. has given a grant-in-aid to the University of New Hampshire for research to isolate new strains of mastitis-causing bacteria. These bacteria will be added to the present Staphylococcus toxoid to improve its effectiveness.

In December, 1959, a vaccine for staphylococcic mastitis control was developed at the New Hampshire Agricultural Experimental Station and made available to dairy farmers. The new vaccine is reported to "almost completely" stop the spread of Staphylococcus-caused mastitis and to reduce the number of flare-ups in infected cows for as long as 18 months.—*Feedstuffs (July 16, 1960): 29.*

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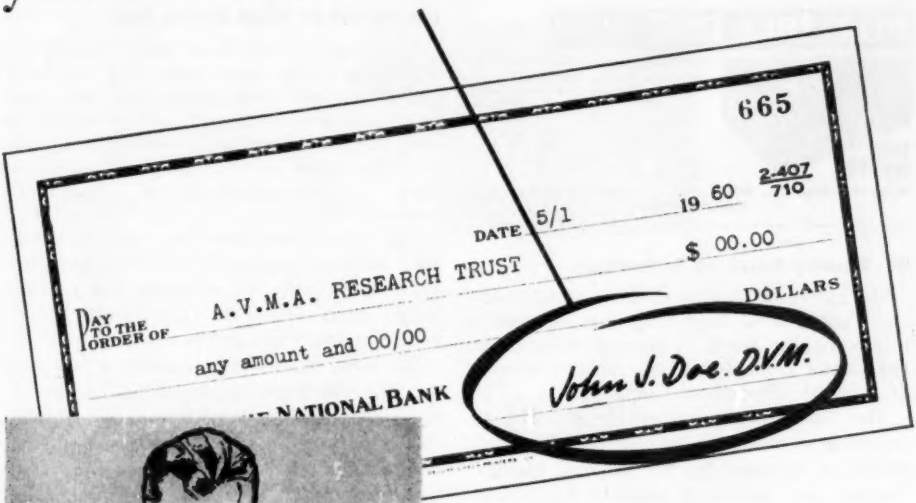

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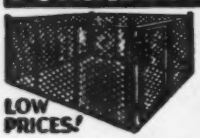

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Dr. Conroy Receives Fellowship

Dr. James D. Conroy of the Animal Medical Center, New York City, has received a fellowship for work in clinical research at the Center from Eaton Laboratories division of Norwich Pharmacal Company.

The fellowship provides for training in veterinary research at Speyer Hospital, which is operated by the Animal Medical Center, and access to medical institutions for observation in such specialties as endocrinology, cardiology and radioisotope work.

Treatment of Wool-Eating Cats

Cats that eat wool to satisfy a craving for something in the wool fibers are no doubt easier to treat than those that eat wool merely as a vice. Some cats eat string or yarn but should not be considered wool eaters. The latter, usually Siamese, prefer to chew on clothing, such as sweaters or scarves.

One feline practitioner of our acquaintance believes that some cats chew wool because they enjoy the pressure thus exerted on the gums around the canine teeth. He reports success from canine tooth extraction.

We have successfully treated a few cats for this condition by smearing lanolin on their noses for an indefinite period of time so they will lick it off. One cat resumed wool eating later but responded when the owner began to treat him again. Prophylactically, the owner gives this cat some lanolin twice weekly.—*J. J. Fishler, D.V.M., Elkhart, Ind.*

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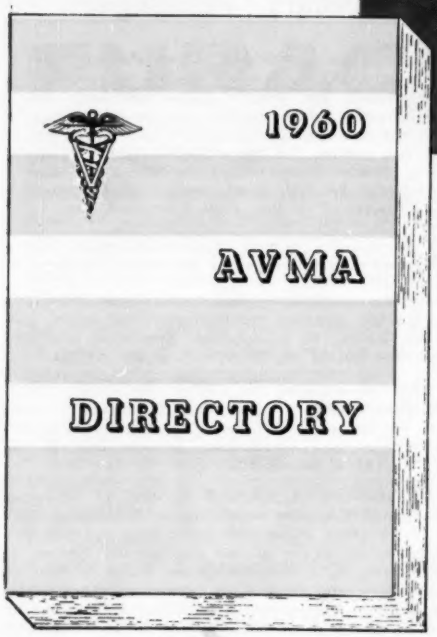

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15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

Wanted—Veterinarians

Wanted—Connecticut licensed veterinarian for busy small animal hospital. Must be experienced and capable of assuming complete management. Partnership or ownership in a short time to satisfactory applicant. Please write complete history. Address Box M 7, JOURNAL of the AVMA.

Industrial position available for recent graduate for diagnostic and research work, mainly with poultry. Histopathology training desired. Please send information on personal and professional background to Box L 62, JOURNAL of the AVMA.

Wanted—veterinarian for large animal practice in Oklahoma. Give details including experience and salary requirements. Address Box L 53, JOURNAL of the AVMA.

Wanted—experienced veterinarian for small animal practice. Good starting salary. State experience and background. Virginia license required. Address Box L 3, JOURNAL of the AVMA.

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Large mid-eastern firm desires Poultry Pathologist, D.V.M. to study, analyze and evaluate livestock and poultry disease problems. Requires a person capable of conducting meetings and formulating policies relating to disease control. Job offers diversification and opportunity. Excellent starting salary and employee benefits. Send resume to Personnel Director—P.O. Box 1656, Richmond, Va.

Wanted—assistant veterinarian. Good salary, possibly leading to partnership. Apartment available. Address Box M 13, JOURNAL of the AVMA.

Wanted—assistant for active, busy, small animal hospital, AAHA, in Midwest. This position has salary, percentage and future. State age, qualifications, references and availability. Address Box M 12, JOURNAL of the AVMA.

Wanted—the Agricultural Division of American Cyanamid Company is seeking a veterinarian with 3 to 5 years' experience with large animals and poultry, to locate at our Agricultural Center in Princeton, N. J. Responsible for design of clinical, laboratory and field trials, analyzing experimental results and making recommendations for terminating or expanding experiments leading to new veterinary products. Address Personnel Relations, Agricultural Division, American Cyanamid Company, P.O. Box 672, Princeton, N. J.

Massachusetts Group Practice—I am interested in establishing a group practice with modern and complete hospital and laboratory facilities for both large and small animals. Choice location at junction of Routes 128 and 129 in Wakefield, Mass. For details of practice prospectus, address Dr. C. Thibeault, Fairlawn Farm, Ipswich, Mass.

Wanted at once—veterinarian for small animal practice on Chicago's north side. Salary open. Address Box L 56, JOURNAL of the AVMA.

(*Continued on adv. p.* 54)

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A Midwest Pharmaceutical Company has opportunity for a veterinarian to render veterinary service to animals at research farm and participate in clinical investigations. Large animal experience required and graduate training desirable. Position will afford professional growth and opportunity with expanding research staff. Salary commensurate with experience and background. Please send complete resume to Box L 55, JOURNAL of the AVMA.

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Given early in acute cases, FURACIN acts to prevent severe, irreversible udder damage of chronic mastitis that usually results in fibrosis and permanent loss of the cow's milk-producing potential. Thus, by reversing clinical signs of acute infection and arresting the process of induration, FURACIN helps maintain the integrity of the duct system and re-establish normal milk production levels.

A large animal practitioner who has made FURACIN his primary antimastitis agent, summarizes its principal advantages:

- it is a professional product
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- it is milk-miscible, thus, seems to be totally distributed throughout the injected quarter
- it does not interfere with healing
- is compatible with other agents[3]

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Improved intramammary dosage form of FURACIN in a convenient, low-cost single-dose, ready-to-use dispenser.

Contains FURACIN, 0.2%, in a water-miscible base.
Available in SQUEEJETS of 30 cc., boxes of 12.

Note: Milk from cows treated with FURACIN Solution Veterinary should be discarded or used for purposes other than human consumption for at least 24 hours after the last treatment.

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The broad-spectrum activity of FURACIN is combined with the specific antistreptococcal action of penicillin for additive antibacterial effect.

Contains FURACIN, 2%, and procaine penicillin G (13,333 units per cc.) in peanut oil with aluminum stearate, 3%. In rubber-capped vial of 100 cc., applicator tube of 7.5 cc., boxes of 12.

Note: Milk from cows treated with FURACIN-penicillin Gel should be discarded or used for purposes other than human consumption for at least 72 hours after the last treatment.

References: 1. Kakavas, J. C.; Roberts, H. D. B.; deCourcy, S. J., and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Jackson, R. A.: A Program for Mastitis Control. Read at the Second Regional Conference on the Nitrofurans in Veterinary Medicine, Madison, Wisconsin, May 28, 1959, pp. 23-26.

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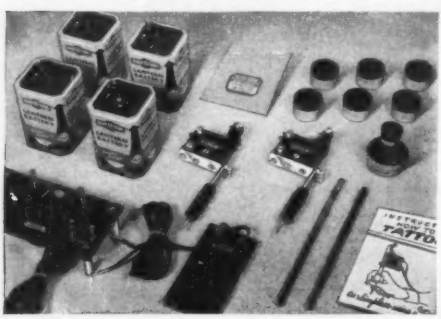
Veterinarian wanted for the Ute Mountain Ute Tribe, Towaoc, Colo. Applications on form 57 will be received from graduate D.V.M.'s until position is filled. For further information, contact John L. Kelley, Cortez, Colo. (phone LO 5-7317) days only, or Chas. D. Whitehorn, Cortez, Colo. (LO 5-7317 days and LO 5-3240 nights.) Mailing address is Towaoc, Colo.

Wanted immediately—veterinarian for young, well-equipped hospital with above-average potential in suburban Maryland. Salary, percentage, eventual partnership. Address Box L 50, JOURNAL of the AVMA.



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Relief veterinarian wanted for small animal hospital in Philadelphia area. Pennsylvania license required. Work occasional weekends and full time 1 or 2 weeks the end of January. Address Dr. S. A. Fox, Box 93, Glenside, Pa.

Wanted—veterinarian for busy small animal hospital in Chicago. Good hours and opportunity for right person. Address Box M 5, JOURNAL of the AVMA.

Immediate opening for alert, experienced veterinarian in progressive AAHA hospital on Long Island. New York license required. Excellent salary and opportunity for future. Address Box M 4, JOURNAL of the AVMA.

Wanted—experienced associate veterinarian for small animal hospital on Long Island. Good opportunity with future. Starting salary range—$9,000 to $10,500. Annual increments. New York license required. Address Dr. S. B. Seader, 74 North Long Beach Rd., Rockville Center, N. Y.

Wanted—veterinarian to assist in busy small animal practice in modern, well-equipped hospital in large southern city. Some large animal work. Address Dr. R. C. Mobley, Mobley Veterinary Clinic, 4709 Gallatin Rd., Nashville, Tenn.

Wanted—experienced, conscientious large animal veterinarian interested in progressive group practice in southern Michigan. Immediate opening. Address Box M 2, JOURNAL of the AVMA.

Wanted—veterinarian for established small animal hospital. Percentage basis. Address Mrs. B. J. Elander, 4110 Lymer Dr., San Diego 16, Calif.

Wanted—Positions

Veterinary pathologist and medical bacteriologist (TEX '50) desires professional or economic advancement. Past 5½ years director of diagnostic laboratory with 4 years as instructor in bacteriology. Last year assistant director of research in graduate school. Master's degree in bacteriology—research in brucellosis and immunology. Also have 2 years practice, 1 year poultry inspection and 2 years regulatory experience. Position need not be in veterinary medicine. Prefer western United States but will consider any offer if the work is challenging. Address Box M 6, JOURNAL of the AVMA.

1958 graduate, married, military obligation complete Feb. 26, 1961, desires small animal position leading to permanent association or purchase. Midwest preferred. Address Box M 14, JOURNAL of the AVMA.

Graduating student (KSU '61), age 29, 4 children, looking for best opportunity, not specific type of practice. Prefer position in Wisconsin, Iowa, or Illinois. Home town—Bloomington, Wis. Available for interview December 19 to 31. Address Wallace Rogers, 8 W. Campus Ct., Manhattan, Kan.

Veterinarian (CAL '56), married, age 30, 2 years' experience in 4-man small animal practice, desires position in Chicago or northern suburbs. Address Box M 1, JOURNAL of the AVMA.

For Sale or Lease—Practices

For sale—outstanding small animal hospital on San Francisco peninsula. Ideal 2-man practice, exclusive location, unlimited possibilities, completely equipped. Capacity—200. Substantial capital required. Address Box H 61, JOURNAL of the AVMA.

For sale—fully-equipped Montana hospital. 24 inside kennels, 16 outside kennels with 24 outside runways. Barn, corrals, 2-car garage, 4-bedroom house. Practice 70 per cent small animals; balance beef cattle and horses. Address Box L 51, JOURNAL of the AVMA.

For sale or lease with option to buy—established small animal hospital in Maryland. Address Box M 15, JOURNAL of the AVMA.

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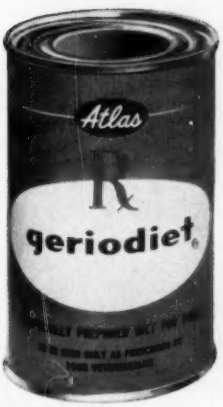

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Wanted to purchase or lease—established small animal practice in Maryland, Delaware, Virginia or West Virginia. Give full particulars. Address Box M 9, JOURNAL of the AVMA.

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Wanted—veterinarian desires to purchase small animal or mixed practice in Wisconsin or Indiana. Address Box L 63, JOURNAL of the AVMA.

Miscellaneous

Pregnancy diagnosis in mares—45th to 150th day. Request mailing tubes: $7.00. Address Pregnancy Diagnostic Laboratories, Dysart, Iowa.

Wanted—pups with cleft palate or parent dogs of such pups, for study of cause and treatment of human cleft palate. Address Dr. R. Dean or Dr. John Kelleher, c/o Mercy Hospital, 2221 Madison Ave., Toledo 2, Ohio, or call collect CH 8-6428, Toledo, Ohio.

For sale—General Electric x-ray, complete with table, stereo, bucky, view boxes, cassettes, tanks. Reasonable. Address R. C. Peckham, M.D., Gaylord, Mich. Phone 4271.

Wanted—dogs with glaucoma, especially female beagle, wirehair fox terrier, and cocker spaniel. We will send crate and pay postage. Address Dr. G. D. Whitney, Dentree Dr., Orange, Conn.

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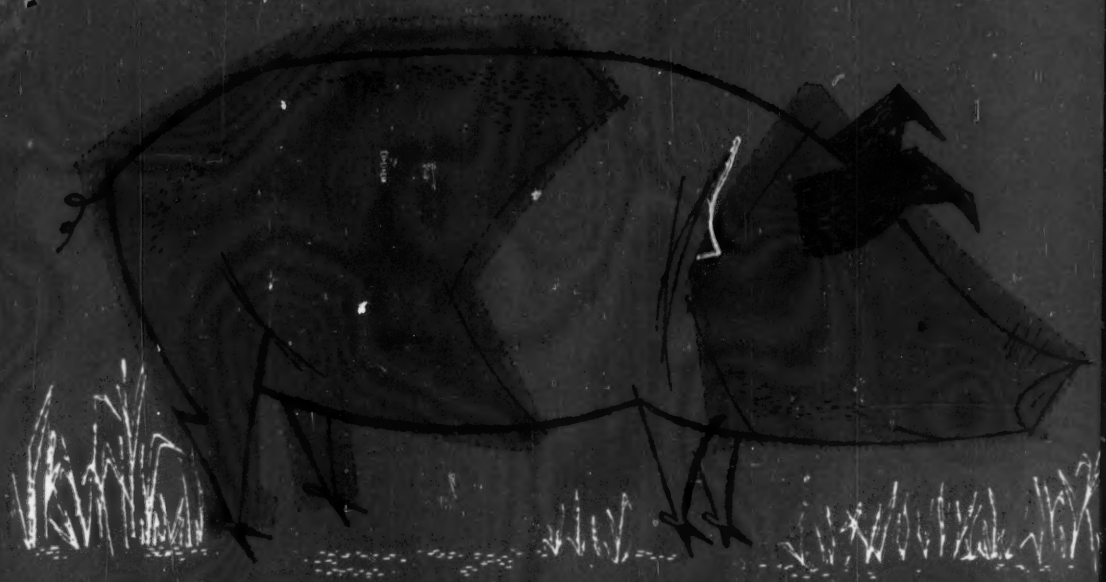

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